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# THE JOURNAL OF ACCOUNTANCY

APRIL, 1920

VOLUME XXIX NUMBER 4

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Income Tax Department

Students' Department

Issued Monthly by
THE RONALD PRESS COMPANY, Publishers
20 VESEY STREET, NEW YORK, N. Y.

Entered as Second Class Matter, Feb. 7, 1916, at the Post Office at New York, N. Y.
Under the Act of March 3, 1879.

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# The Journal of Accountancy

Official Organ of the American Institute of Accountants

Vol. 29 APRIL, 1920 No. 4


## Auditing Features of the Mining Industry

By J. C. Hooker

### Economics of the Business

Mining, industrially, belongs to a special group of three. It is like agriculture and commercial fishing, in that it draws all of its raw material directly from Mother Nature, and unlike nearly all other businesses in its general analysis. In other words, there are two essential factors which distinguish mining from most other lines of modern industrial activity:

First, the greater risk or extra hazard always involved, and,

Second, the outstanding fact that its uncertain life is fixed by that which nature has hidden in the ground and one is powerless to tell what or how much until some real development money is spent. Sometimes this returns a profit, but often only disappointment and no income—even with promising mineral deposits.

Hence, the peculiar hazards of prospecting, locating and operating mines frequently leave nothing for the investigator to audit, except accumulated expense, scrapped machinery and large deficits. However, development work on new prospects in American fields during the past sixty or seventy years has continued more or less steadily, and mineral production in the United States (including Alaska) amounted, approximately, to the huge sum of $5,011,000,000 during 1917—more in value than the returns from any other single industry save railroads. But a miner who sells his silver or coal is also selling, at the same time, a part of his mine. An apparent net income for any operating period is not all true profit, but part profit and part return of capital. This points to what are now becoming more generally known as "wast-

ing assets"—exhibited by the gradual exhaustion of natural ore-bodies and virgin coal deposits, decreasing flow of oil wells and cut-over timber lands, and identified by the specific term of depletion. The other related term, depreciation of physical property (houses, furniture, machinery, vehicles, etc.), is common to all classes of industries. But depletion refers only to natural resources, and is usually calculated by the method known as the unit-cost (per ton, pound, ounce, etc.) basis, so as to spread the periodical allowances therefor over a number of years and finally return to the owner or the lessor the full amount of his true capitalized costs by the time his mine or other deposit is completely exhausted.

This item of depletion has been fitly described as "precisely like an account in a bank which is being wound up by a receiver" and does not carry with it the current idea of a continuing enterprise so often taken for granted in other industries like shoe manufacturing, wheat raising or a retail grocery—i. e., a fresh raw material supply for a coal mining plant or a copper mill cannot be drawn for a very extended period solely from one deposit or group of mines.

### Business Organization

There are usually three different phases of the mining industry, all necessary to bring the native ore or raw material down to anything like a finished-goods state. Occasionally all three processes are combined under one operating company, but more often under two or three separate organizations corresponding to the successive stages in the completed product. These distinct steps are:

(1) Digging out or mining the raw material;
(2) Crushing it with stamps or rollers into pulp or concentrates; then
(3) Smelting this latter into the raw (blister) copper, unrefined silver, gold or other metal.

This last transitory product, in turn, is to be shipped long distances to refinery plants for a finishing process before it can be commercialized as salable goods.

These separate processes, then, necessitate a large organization, frequently with a small central or home office and larger ones cor-

responding to two, three or four large branches or subsidiary forces, e. g.,

(a) The mine office organization,
(with 500 to 2,500 employees);

(b) The mill office organization,
(employing 50 to 500 people);

(c) The smelter force,
(numbering 300 to 700 employees); and

(d) If the main plant, or mine, is in an isolated position, it frequently happens that a necessary fourth group of employees constitutes the transportation force required to operate a branch railroad, from 3 to 100 miles in length.

This last is needed for hauling the raw ore or quartz to a separate and well-watered mill-site, to a trunk line railway or to the distant seaboard, and for bringing in all necessary men, material and supplies.

### Characteristics of its Legal Status

The legal status of a mining property is infrequently that of a single individual or a partnership: in the majority of cases it is controlled and operated by a corporate management or a consolidation of two or more corporations organized under the more favorable laws of an adjoining or distant state or even of a foreign country.

### Special Characteristics of Accounting Books Used

Unfortunately for the investigator's purpose, the accounting books of the average small mining company consist merely of the usual cashbook, an incomplete ledger for controlling and a few expense accounts and a cheque book. In coal companies a sales register and a coal customers' ledger are added to the above. Also at the home office of some operators will be found a general journal, with such additional corporate records as a minute book and stock register; but frequently a comprehensive voucher register is used in lieu of a journal and nearly all important transactions, especially those relating to disbursements, are handled by journalizing everything through this medium, while the cashbook takes care of the receipts.

From the time books and time cards the usual voluminous pay-

roll is built up twice each month; thence its distributions of labor (and also the warehouse distribution of sales to employees, outside purchases and material) are expeditiously worked into the ledger, by means of the above-mentioned voucher register, with only two corresponding voucher entries. This register is provided for each separate month with a distinctive serial number indicating that month, so that entries for a later month can be easily carried along concurrently (under a method of consecutive odd and even numbers), without waiting for the close of the current month's record.

In a few instances, among the smaller mining companies and partnerships (as with many small modern oil operators), the cashbook, journal and voucher register are all combined in one columnar book (of the "Boston ledger" type), wherein all entries are made when the bills are paid. In preparing these vouchers, when the corresponding cheque is drawn separately, the voucher number is entered on the cheque stub and the cheque number on the face of the voucher; in other cases, a combination voucher cheque (perforated horizontally through its middle portion) is drawn and forwarded to the payee, who detaches the cheque, receipts the voucher portion of the document and returns it. All supporting data are then fastened to this receipted voucher, or its retained duplicate, and it then becomes a docket (or file-wrapper) for the protection of connected papers as well as a receipt to vouch for the payment.

Of course, among the larger operators, the auditor will usually find the standard cashbook, journal and ledger, together with all necessary subsidiary records—including accurate and exhaustive assay and metallurgical registers, from which can be verified the raw (or mine-run) output, mill products (or concentrates), metal contents of each car of ore, the fineness of each metal mined, minute details appertaining to the cost records of each separate deposit or mine, mill and smelter production and the sales of the finished products or equivalent shipments to refinery plants. Where labor payment is made by cheque and the payrolls contain many names (often listing as many as 2,000 and 2,400 persons monthly) the payroll cheque register should show accurately and in serial order all cheques issued during the month or other period covered; and its footings or totals must correctly balance against the total

audited vouchers, plus the combined amounts of cancelled, spoiled and unclaimed pay cheques and all daily time cheques issued between the regular pay dates covered by the investigation.

## Mining Assets

The assets of a mining concern differ from those of an ordinary business in that the principal item, generally representing the value of an ore deposit, coal bed, rock quarry, clay field, etc., is of a vanishing or wasting nature, directly dependent upon the life of the property, expressed in months or years required to extract all the raw material and reduce that asset to nothingness—hence the origin of annual depletion deductions or reserves out of current income to replace or redeem the initial capital assets costs as a purchase fund for a new mine or further raw supply.

False or excessive goodwill to cover up capital deficiency in regard to tangible assets, like mining leases donated or options on mining claims purchased, is frequently set up by mining concerns to inflate the debit side of their balance-sheets. These excessive values should be "unwatered" by the careful auditor.

Then again, the ownership value of a mining claim or patent right to mining land ofttimes hinges on keeping up certain stipulated assessment requirements, like compulsory physical improvements on the property each year, in order to retain the title. Otherwise, a lapse in the development work leaves the property open to claim jumpers and may entail a total loss to the first owner to the extent of all original costs plus any subsequent development expenditures.

Relatively speaking, principal mining capital assets possess a large contingent element, rather than a fixed and permanent status.

## Special Features About Mining Liabilities

Since the extra hazardous nature of all mining enterprises places them in a category distinct from undertakings of a more stabilized character, it would appear the part of wisdom and common business prudence to set aside from current earnings during each operating year certain voluntary reserves to safeguard and meet the ever-probable contingencies due to sudden accidents, mine explosions, underground fires, cave-ins and other mishaps

common to mining ventures. To avoid financial embarrassment in meeting the losses thus occasioned, contingent liability reserves should be built up, periodically, from net income, in amounts sufficient to provide for any emergency (with corresponding reserve funds on the assets side); but unfortunately this safe practice seems to date to have been the exception rather than the rule with the majority of mining corporations. This necessity is strongly emphasized by the fact that no insurance companies have yet been found willing to underwrite such enormous operating risks as attach to mines. This condition is illustrated in balance-sheet N under the sub-heading "mining balance-sheet."

If the parent mining company has subsidiaries which operate lumber mills, branch railways, power plants, coking plants, coal washers, steel plants, etc., as is frequently the case, careful search should be made for such liability obligations as notes payable transferred, guaranteed surety bonds of a subsidiary, speculative mining contracts when values are low, etc., where no entry appears and no contingent reserve has been set up. Such action or failure to make provision may readily be traced to the common human tendency to understate liabilities, rather than to overstate them or show the true status of all obligations.

Mention should be made here of the strict requirements of the present income-tax law (act of 1918) and supporting treasury regulations and decisions in regard to the allowable elements of invested capital for mining corporations; consequently, the closest scrutiny and most careful analysis of all capital liabilities become a prime duty of the auditor.

### Proprietorship Accounts of Mines

Proprietorship accounts are not dissimilar from the same class of accounts in other industries, and, so long as an individual works a mine and keeps clear of bankruptcy, he can keep such accounts as he pleases. However, if no books at all are kept or if books are kept in an unintelligible manner, and an accounting is directed by the court, the presumption is against the negligent owner or operator.

In partnership mining properties, the usual capital account for each partner is maintained to take care of his proportional investments and withdrawals. There is, however, the special rule that

while co-owners in mining ventures share profits and losses equally, unless there is a specific written agreement to the contrary, this same equity does not extend to property holdings.

### Mining Balance-sheets

The special features of the balance-sheets—those important, necessary and illuminating mirrors of any industry's financial progress and present condition—can best be demonstrated not in word pictures but in actual examples. Inasmuch as the general mining industry, comprehensively speaking, covers numerous and varied classes—each identified with peculiar characteristic details and slightly variable methods of operation—it is manifestly impracticable to interpret or represent fully and in exhaustive detail all classes of mineral production within the narrow scope of this paper. Therefore, there are here presented only two specimen mining balance-sheets, each distinct from the other but illustrating the two most prominent class-groups of the business, viz., metals and coal. As the year 1913 represents a low ebb, graphically and financially, in the fuel class of mining operations, form M is here given as a fair average exhibit of a typical deficit in that class. Likewise, as 1917 represents the peak-high year for prices and quantity of production in the metals class, form N has been selected as an instructive exhibit of a metal corporation's very creditable surplus during that year.

Form M — *THE X COAL MINING COMPANY*

General Balance-sheet, December 31, 1913

| *Assets* | | | *Liabilities* | | |
|---|---|---|---|---|---|
| Cash assets: | | | Current liabilities: | | |
| In bank..... | $386.00 | | Vouchers payable ..... | $6,233.00 | |
| Advances to employees. | 168.00 | $554.00 | Accounts payable ..... | 2,931.00 | |
| | | | Unpaid wages. | 1,401.00 | |
| | | | Store cheques. | 803.00 | $11,468.00 |
| Inventories: | | | Deferred or accrued liabilities: | | |
| Coal ..... | $5,127.00 | | Taxes accrued ..... | $3,000.00 | |
| Store ..... | 417.00 | | Accrued interest ..... | 2,345.00 | |
| Explosives... | 173.00 | | | | |
| Stable ..... | 68.00 | 5,785.00 | School funds (in trust).. | 282.00 | 5,627.00 |

| | | | | | |
|---|---|---|---|---|---|
| Accounts receivable..... | | $6,247.00 | Reserve for depreciation.. | | $18,000.00 |
| Deferred assets: | | | Capital: | | |
| Unexpired insurance.. | $104.00 | | Capital stock..100,000.00 | | |
| Accrued royalty ..... | 130.00 | 234.00 | *Less* unsold... 27,500.00 | | 72,500.00 |
| Fixed assets: | | | | | |
| Plant & fixtures .....$39,077.00 | | | | | |
| *Less* depreciation ..... 20,605.00 | | | | | |
| | $18,472.00 | | | | |
| Mines* ..... 12,250.00 | | | | | |
| Surface land, (real estate) ..... 50,000.00 | | 80,722.00 | | | |
| *Deficit (operating)*..... | | 14,053.00 | | | |
| | | $107,595.00 | | | $107,595.00 |

FORM N

*BIG Z METALS MINING CORPORATION*

Balance-sheet, December 31, 1917

*Assets*

| | | | |
|---|---|---|---|
| Current (or liquid) assets: | | | |
| Cash at X office..... | $132,390.00 | | |
| Cash at Y office..... | 6,552.00 | | |
| Call funds in New York office.. | 460,014.00 | $598,956.00 | |
| Accounts receivable ..... | $55,671.00 | | |
| *Less* reserve for doubtful accts. | 3,100.00 | 52,571.00 | |
| Contingent fund (contra)..... | | 1,029,408.00 | $1,680,935.00 |
| Inventories: | | | |
| Mine and mill supplies..... | $120,900.00 | | |
| Office supplies ..... | 5,078.00 | | |
| Bullion in transit..... | 216,312.00 | | |
| Ore on hand..... | 11,544.00 | | |
| Concentrates on hand..... | 35,582.00 | | 389,416.00 |

* This represents an old mining property practically depleted, with plant, buildings and machinery ready for scrapping. It also illustrates the point of non-impairment of invested capital by an operating deficit, hence not shown as a deduction from capital liabilities.

| | | | |
|---|---|---|---|
| Deferred assets: | | | |
| Employees building loans..... | $31,212.00 | | |
| Advanced insurance (unexpired) | 3,000.00 | | |
| Accrued interest (unpaid)..... | 18,889.00 | | $53,101.00 |
| Fixed assets: | | | |
| Mining claim "patents"..... | | 124,318.00 | |
| Mines (operating).....$3,100,260.00 | | | |
| *Less* reserve for depletion..... | 760,058.00 | 2,340,202.00 | |
| Mill and plant (12/31/16).....$1,877,008.00 | | | |
| Construction added on new smelter during year..... | 1,589,089.00 | | |
| | $3,466,097.00 | | |
| *Less* depreciation (1917)..... | 675,644.00 | 2,790,453.00 | 5,254,973.00 |
| Total assets..... | | | $7,378,425.00 |

*LIABILITIES AND CAPITAL*

| | | | |
|---|---|---|---|
| Current liabilities: | | | |
| Mine drafts payable..... | $58,847.00 | | |
| Pay cheques outstanding..... | 83,588.00 | | |
| Vouchers payable ..... | 43,029.00 | $185,464.00 | |
| Contingent liabilities: | | | |
| Unpaid damage suit against new smelter process .....$1,018,914.00 | | | |
| Reserve for accidents..... | 114,000.00 | 1,132,914.00 | |
| Fixed liabilities: | | | |
| Funded debt (bonds)..... | $50,000.00 | | |
| Mortgage payable ..... | 110,000.00 | 160,000.00 | |
| Capital and surplus: | | | |
| Capital stock .....$3,270,000.00 | | | |
| *Less* unissued ..... | 115,000.00 | | |
| Total outstanding..... $3,155,000.00 | | | |
| Surplus (12/31/16)..... | 1,741,947.00 | | |
| Net profits for 1917..... | 1,003,100.00 | 5,900,047.00 | |
| Total liabilities and capital..... | | $7,378,425.00 | |

### Special Features of Mine Expense

Best results are found in plants where accuracy, clearness, simplicity and applicability are the prime elements of the system. While many features of a comprehensive mining cost plan are in

common use in different fields and in different groups of mines in the same field, yet no iron-clad uniform system is strictly applicable to all cases in the same class of mining nor in all classes of mineral production. A careful analysis of the particular demands to be met should furnish the guiding motif of the system installed, and the accountant, manager and his engineering staff should be found coöperating to work out the details of that system.

It is believed that the outlined cost schedule, illustrated in the three tables and notes given below, very fairly covers the elastic practices of most going concerns in the mining industry of the United States to-day. As a general rule, there is very little advertising expense incurred, and no indemnity insurance against operating accidents like mine fires, explosions and flooding can be secured. Then besides those expense items common to other industries—like general, office, superintendence, taxes, interest, repairs, workmen's compensation insurance, etc.—the following special cost segregations are in use by many mining companies:

*TABLE A*

*COST ACCOUNTS*

Special expense items—Mining operations

| Mining (*) | Milling | Smelting |
|---|---|---|
| Engineering | Steam plant | Sampling (or laboratory) |
| Breaking ore | Pumping | Boiler-house |
| Timbering | Electric power & light | Power-house |
| Hoisting | Rolls or stamps (coarse crushing) | Ore and coke delivery |
| Tramming (or haulage) | Regrinding | Roasting |
| Sorting and loading | Screens and elevators | Pumping |
| Mine cars and rails | Tables and vanners | Mud-mill (lining for converters) |
| Track laying | Conveyors | Crane (overhead) |
| Pumping (or drainage) | Laboratory | Loading bullion |
| Ventilation (fans, etc.) | Teaming (stable exp.) | Hauling slag |
| Lighting | Machinists | Briquetting (or molding) |
| Assaying and sampling | Blacksmiths | Lighting |
| Surveying | Electricians | Electrical shop expense |
| Change-house | Carpenters | Tramming (or hauling) |
| Saw-mill | Cooling pond | Belt conveyors |
| Warehouse (mat. and sup.) | Tailings expense | Cooling pond |
| Explosives (blasting) | | |

(*) For slight variations to cover coal mining expense see next table (B).

*TABLE B*

Items of coal mining expense

1. Mine office
2. Superintendence
3. Engineering
4. Mining
   a. hand
   b. machine
5. Timbering
6. Deadwork
7. Tracklaying
8. Drainage
9. Ventilation (blowers and fans)
10. Haulage and hoisting
11. Dumping and tallying
12. Preparation (sulphur and slate picking, etc.)
13. Loading in railroad cars (including yard expense)
14. Power*
15. Repairs (buildings and structures)
16. Miscellaneous (or sundries)†

* The power utilized in operating screens, crushers, elevators, conveyors, picking tables, loading booms, etc., and material and labor charges for repairs to all such equipment are commonly classed under the heading of "preparation" of coal for the market. The item of power is further distributable to machine mining, haulage and hoisting, drainage (pumping) and ventilation (fans).

† If a washer is operated, its cost and operation should stand as a separate entity.

The same is true of a coking plant.

*TABLE C*

Daily labor and production report*

Date....., 191...

| Surface | Total 3 shifts | Underground | Total 3 shifts |
|---|---|---|---|
| a. Office force | | a. Mine foreman | |
| b. Mining engineering | | b. Shift bosses | |
| c. Mill foreman | | c. Miners—machine | |
| d. Smelter superint'dt | | " hand | |
| e. Master mechanic | | d. Muckers | |
| f. Machinists | | e. Timbermen | |
| g. Electricians | | f. Nippers | |
| etc. | | g. Shaftmen | |
| | | h. Trammers | |
| | | etc. | |
| i. Total men..... | | i. Total men..... | |
| | | j. Product per man..... | |

k. Total number of men employed.....

*As a check upon the timekeeper's daily reports, from which the payroll is prepared, surface foremen and underground shift bosses are required to take each man's time as they make their rounds, and submit independent reports to the superintendent, for the purpose of verifying the bi-weekly or monthly totals shown on the payrolls.

l. Product per man.....
Number of cars trammed.....
Number of tons hoisted.....
Etc.
Total product per month.....days.....
Average daily product for month.....
Number cars shipped from stock pile.....
m. Tons of ore (or coal) hoisted.....
Etc., etc.

---

..... Timekeeper.

In addition to the more or less standardized expense elements listed above, the following special points should be noted:

(1) In coal mining the maximum work time is 300 days—with a liberal average of 210 days—and the cost per ton varies accordingly. But at most large metal mines operations shut down only on Christmas day, and occasionally on the fourth of July; and there the usual operating rule is 24 hours a day, in three 8-hour shifts.

(2) The mining operator is entitled to a greater margin of profit on account of the peculiar hazard not present in other industries. In the event of heavy floods, washouts or mine-fires, the extra expense of recovering the mine or flooded workings should be shown as a special and separate charge to operations. If experienced foresight has provided an accident reserve for such a contingency, as before-mentioned in this paper, such special charges can be met without embarrassment.

(3) Another cost element is the ever-changing values of coal properties, due largely to fluctuating demands for fuel, which vary directly with seasonal temperatures and industrial activity, besides slighter variations traceable to obsolescence of certain classes of mining equipment and conservative or non-conservative mining methods in different coal fields.

(4) Coal operators mine their most valuable coal deposits first, but copper men do the opposite when prices are high, and thus leave their high-grade ore reserves for the dull seasons.

(5) Mining costs, then, may be briefly summarized as follows:

a. Primary cost = actual expenses of operating, excepting interest and payments on borrowed capital.

Here metals and coal follow the same general expense schedules, with special increments for metals due to necessary treatment of the concentrates and bullion by smelting and refining processes to bring them to a finished marketable state. An interesting comparative estimate, between the two general classes of mining operations, may be gathered from the table on page 254—though, unfortunately, statistical figures showing costs per pound, ounce, ton, etc., are not available, nor, in fact, existent for purposes of comparison at the present day:

b. Secondary cost = charges for depreciation, plus depletion, plus interest on investment and capital, plus taxes, plus risk, plus shipping and selling expense, plus reasonable profit.

c. Primary plus secondary = selling price, in both instances.

## Special Characteristics of Mining Income

Mining income, in the case of raw blister copper or bar gold and silver, are mainly derived from sales of what should be termed unfinished (instead of finished) products, since this semi-raw material must yet go to the refineries to be converted into merchantable goods.

Then, in addition to actual receipts from sales of silver, copper, gold, lead, zinc, iron, coal, phosphate, platinum, sulphur pyrites, tin, cobalt, clay, etc. taken from underground workings, there are considerable profits from the company stores commissary and boarding-house operations, cottage and ground rentals to employees, sales of safety lamps, candles, black powder, fuses and other explosives, water rentals, power and light rentals to associated companies and neighbors or town sites, and very frequently from surface farming operations and timber sales on surplus land not in actual use for mining purposes, plant buildings, and mill or smelter sites. In one instance the writer knows of a 200-acre potato farm bringing in good revenue from extra surface acreage

THE COMPARATIVE PRIMARY COST ELEMENTS IN METAL AND COAL OPERATIONS

| | Mining | | Milling or preparation | | Smelting | Refining |
|---|---|---|---|---|---|---|
| No. | Metals | Coal | Metals | Coal | | |
| 1. | Administrative | Administrative | Steam plant | * | | |
| 2. | Superintendence | Superintendence | Pumping | | | |
| 3. | Surveying | Engineering | Rolls or stamps | Crushers | | |
| 4. | Breaking ore, | Mining, | Regrinding | | | |
| | a. hand | a. hand | | Sulphur & slate picking | | |
| | b. machine | b. machine | | | | |
| 5. | Timbering | Timbering | Screens and elevator | Screening | | |
| 6. | Hoisting | Haulage and hoisting | Jigs (concentrating) | Spiralizers | | |
| 7. | Tramming | (see No. 6) | Tables and vanners | Picking tables | | |
| 8. | Sorting and loading | Dumping and tallying | Conveyors | Conveyors | | |
| 9. | Mine cars and rails | (see No. 6) | Laboratory charges | | | |
| 10. | Tracklaying | Tracklaying | Teaming | (Stables) | | |
| 11. | Pumping | Drainage | Machinists | | | |
| 12. | Ventilating | Ventilation | Blacksmiths | Smithing | | |
| 13. | | Deadwork | Electricians | Electrical | | |
| 14. | Lighting | (see No. 15) | Carpenters | Carpenter shop | | |
| 15. | | Power | Coke | | | |
| 16. | Explosives | (sub-account) | Cooling pond | | | |
| 17. | Assaying | | Tailings expenses | (Waste disposal) | | |
| 18. | Saw-mill | (sub-account) | | Loading booms | | |
| 19. | Warehouse | Materials & Supplies | | | | |
| 20. | Repairs | Repairs | | | | |
| 21. | Incidentals | Sundries | | | | |

Applicable to *metals* only. See table A.

Applicable to metals—but partly correlated to washery process for coal.

*All items in this column generally classified under the one term *"preparation"* in coal operations.

along a well-watered stream adjoining the mill and smelter plant of a successful copper operation in northern Arizona.

### Profit and Loss Statement

None of the features of a mining company's profit and loss statement needs special stress or particular emphasis, excepting the item "reserve for depletion," which is usually made up of successive monthly allowances set aside against the final extinguishment of the mineral deposits and is a proper deduction from the net profit figures in determining correct additions to surplus from the year's operations. See the following example:

"Y" Copper Company
Profit and loss statement, December 31, 1918

| | | |
|---|---|---|
| Metal sales: | | |
| From copper produced | | $1,330,440.00 |
| " silver " | | 5,495.00 |
| " gold " | | 20,279.00 |
| | | $1,356,214.00 |
| Less cost of production: | | |
| Total mining expense | $640,872.00 | |
| " milling charges | 302,016.00 | |
| " smelter charges (or fees) | 115,100.00 | |
| Total production charges | | 1,057,988.00 |
| Gross operating profit | | $298,226.00 |
| Add other income: | | |
| Royalties | $17,500.00 | |
| Rents | 5,210.00 | |
| Powder sales, etc | 2,300.00 | |
| Store accounts | 5,200.00 | |
| Farming and timber sales | 6,007.00 | |
| | | 36,217.00 |
| Total profit | | $334,443.00 |
| Less other deductions: | | |
| Interest, exchange, etc | $18,900.00 | |
| Taxes (local and federal) | 14,001.00 | |
| Experimental expense | 19,791.00 | |

| | | |
|---|---|---|
| Legal (organization) expense | $4,129.00 | |
| Transfer (to smelter) expense, or freight outstanding | 6,141.00 | |
| | | $62,962.00 |
| Net profit | | $271,481.00 |
| Less reserve for: | | |
| Depreciation for 1918 | $62,533.00 | |
| Depletion for 1918 | 71,082.00 | 133,615.00 |
| Profit and loss (to surplus) | | $137,866.00 |

## Journal Entries

Journal entries for typical mining transactions may be appropriately illustrated by the following examples:

A. If a mining corporation is formed with a capital stock of $400,000. and the entire amount is issued in exchange for one developed mine and options on other mining claims adjoining the main property, and agreement is made to return or donate to the corporation $150,000. face value of this stock, for working capital purposes, the entries would appear as follows:

| | | | |
|---|---|---|---|
| (1) | Lone Tree mine | $250,000.00 | |
| | Other mining claims (options) | 150,000.00 | |
| | To capital stock | | $400,000.00 |
| (2) | Treasury stock | $150,000.00 | |
| | To donations (working capital) | | $150,000.00 |

Then,

| | | | |
|---|---|---|---|
| (3) | Cash | $70,000.00 | |
| | Donations (working capital) | 30,000.00 | |
| | To treasury stock | | $100,000.00 |
| | (Representing sale of 1,000 shares of common capital stock returned to the treasury and sold at $70.00 a share.) | | |

Later,

| | | | |
|---|---|---|---|
| (4) | Stripping and development | $35,000.00 | |
| | Sinking shaft No. 1 | 10,750.00 | |
| | Engineering surveys | 7,250.00 | |
| | Saw-mill installation | 11,480.00 | |
| | Tipple construction | 1,520.00 | |
| | Mine railway trackage | 4,000.00 | |
| | To cash | | $70,000.00 |

The above development charges would later be capitalized, by spreading them over several fiscal periods, as soon as operations had progressed sufficiently to furnish increased earnings for that purpose.

B. To provide for the gradual extinguishment or exhaustion of the coal deposit (or ore body) out of current income during each year while actual tonnage is being mined, the following is applicable:

| | | | |
|---|---|---|---|
| (1) | Depletion (1/12 monthly, or year 1919).... | $19,152.00 | |
| | To reserve for depletion ..... | | $19,152.00 |
| | (This is based on unit-cost [en bloc] output of mine during the year, say 840,000 tons of coal at .0228c. per ton.) | | |

Later, when the mine is practically worked out or down to a salvage basis, the final adjustments for residual values would appear thus, leaving the restored capital sum free as purchase money for a new mine or location:

| | | | |
|---|---|---|---|
| (2) | Profit and loss..... | $3,750.00 | |
| | To mine (coal pillars, etc)..... | | $2,620.00 |
| | Plant and machinery (scrap, estimated)..... | | 1,130.00 |

## Special Auditing Points to be Considered in Mining Engagements

(a) Careful attention should be paid to any lump charges carried to capital accounts in order to uncover any operating expense items—such as mine administration salaries, electrical repairs, removal of slate, maintenance of mine cars, timbering, depreciation of rails, assaying, explosives, etc.—that may have been included in the development or plant investment figures.

(b) Adequate reserves for depreciation of all physical assets about the plant should be set up, and if no provision for depletion of wasting assets, such as ore bodies, coal deposits, standing timber, etc., has been made, the auditor should invite particular attention to this omission, and explain the basis for this desirable and permissible reserve from income in regular, periodical instalments.

(c) As miners are generally paid on the basis of tons of coal or other mineral actually mined, the production for a given period should be easily verified, if the auditor first satisfies himself as

to the correctness of inventories at beginning and end of period Both sales of output and miners' wages can be checked in this manner.

(d) In the case of many iron and coal properties the raw material is mined from leased land, for which royalties are paid at an agreed rate per ton, fixed in the original lease or contract, and extending often over a period of seven to thirty or more years. These royalties should always be verified from the lease and production records, rather than from receipted vouchers on file, as there is ofttimes ample opportunity for fraud or collusion in securing local receipts for voucher payments. When minimum royalties must be paid, whether production covers the outlay or not, the balance of the payment is often treated as a deferred charge, such as "royalties in advance," until the yearly tonnage output again exceeds the minimum. Then this deferred account may be cleared by successive charges to operating expense.

(e) Many mine and smelter payrolls are voluminous, and, in some instances, there are excellent internal checks from time cards and other time-keeping records, but in the main the correctness of each payroll can only be verified by the manner of its preparation and payment—preferably passing through the hands of three or more persons before actual payments are made by cheque. The average payroll provides deduction columns for such items as powder sales, safety lamps, cottage and water rents, board, commissary and store accounts; and the auditor should carefully examine these various accounts to see that proper credits have been entered therein for the corresponding totals of the payroll columns. In payroll allowances most copper companies and some silver and gold companies base their wage rates on a graduated daily scale, per 8-hour shift, plus a flat 10 cents (or more) daily bonus to all grades of employees, or a 15% to 40% straight monthly bonus based on the average price of the raw metal in the New York market for the preceding month. But coal miners are usually paid on the prevailing price for lump, screened or mine-run ton of output.

(f) Unless accurate and careful assay and metallurgical records are kept at the plant, as frequently happens, one will find no thorough check on the production of some copper, silver and other metal mines, since it usually varies with the fineness of each

ton of output. If the raw ore or quartz is shipped elsewhere for milling and smelting, or is sold outright to a customs smelter, careful sampling and assay records are immediately made on receipt of car-load lots; and, in the event of disputes or disagreements as to the metal contents of the ore or concentrates, an independent umpire (always an experienced inspector) is employed to decide the issues and his judgment is final for both parties in regard to the financial settlement sheets. These record sheets should always be scrutinized.

(g) Usually the superintendent's reports to the main office, as to expenditures, are such as to permit a proper and correct analysis by an auditor, but some mining concerns are extremely secretive about their records and financial affairs and are prone to disallow inspection by either government or other agents.

## Conclusion

As a final suggestion, all accountants should urgently recommend uniformity of accounting practice in all classes of mining operations, with evident benefit both to the owners and management of such enterprises and to the accounting profession. It is noted, with keen interest, that this lack of uniformity in mine accounting is particularly emphasized by Wade Kurtz, in his excellent paper appearing in the January, 1920, issue of The Journal of Accountancy.

# Payroll Audit—The Duties of the Auditor

By Grafton Whiting

In examining the books of a modern manufacturing plant, it will be found that the amount represented by the payroll is a large if not the largest current expenditure and, by comparison, the one that is susceptible to the most irregularity.

The accuracy of cash expenditures for the purchase of material may be readily audited through examination of the records and vouchers. The proof of the accuracy of the payroll itself is, however, an entirely different matter and should be treated as a separate task.

The benefits to be obtained from the payroll audit are those in common with any audit or verification of bookkeeping; viz., that it establishes a confidence in the mind of the executive that the work is being properly done and that the results after a professional investigation are as they should be.

The special purposes of a payroll audit may be briefly described under the following headings:

Verification of the payroll figures.
Process of paying off.
Discovery of opportunity for padding.
Suggestions for improvement.

There can be no fixed procedure, nor can there be any fixed statement of the benefits to be derived, as each audit has its peculiarities and the results must be based upon the findings when the work is completed.

But, in general, it may be stated that the operators seeing the auditors at work appreciate that the accuracy of the clerical work in compiling the payroll and the general procedure is being proved by outside and unbiased investigators. When two or more audits are conducted during a year at times unknown to the office and payroll staff, the moral effect obtained is worthy of note.

## Verification of the Payroll Figures

The main object in verifying the figures is to ascertain that they are correctly compiled from the records. The supporting records of the payroll must next be investigated and the time records and piece records proved to be properly made out and systematically recorded, to ascertain that the records are justified by the conditions found.

### *Time records*

There is considerable variety in methods of time-keeping in different plants, but in the main the auditor should find a distinct proof that the operators were in the plant and at work during the periods shown on the time record.

Irregularities in the time recording should be followed through to ascertain whether they are purposely inaccurate or through error incorrect figures are used. Time-keeping is apt to be regulated according to past custom, and this past custom in many instances is based on old-fashioned methods which have outgrown their usefulness.

### *Piece work*

The process of checking piece rates consists of two parts: first verifying the accuracy of the rates and that these rates are properly established; and, second, ascertaining that the quantities represented by the production so reported are justified by the output of the department. It is necessary to trace back the origin of the production records and to ascertain what opportunity there is for overstating production through false weights or count or tampering with mechanical recording devices.

### *Payroll figures*

The extensions on the payroll should be verified as far as practicable. This may be accomplished by certain tests or may be carried through in detail. Experience has shown that errors in extensions are largely due to carelessness, and that there seldom is an attempt at falsification in carrying out the extensions on the payroll itself.

The footings of the payroll, however, should be verified throughout and the total should be in agreement with the amount of money withdrawn from the bank for payroll purposes.

### Process of Paying Off

In the process of paying off, identification of the operator paid is an important feature of the audit, in that each item on the payroll should be found to be paid to the operator whose name or number appears opposite the entry.

It is not practicable in large plants always to have the operator's name called at the time of paying off, but there should be some system of pay slips or brass checks or at least identification by the foreman of the room or the paymaster as a check against paying the wrong person. Care should be exercised that one operator does not receive more than one envelope, unless the payroll is divided, as it is in some instances where an operator's name appears more than once on the roll. The unclaimed envelopes in the payroll should be collected by the auditor and be brought by him to the office for proper accounting.

The recording and checking of these unclaimed envelopes and their care in the office should form a part of the auditor's report. In ordinary circumstances, the unpaid envelopes should be registered as a part of the office system and care should be exercised to see that they are properly checked off as payment is made. It is preferable that a double check be instituted and that each payment be initialed by the clerks in charge. After lapse of a month the unpaid envelopes should be opened and the currency should be deposited in the bank, a proper liability being set up on the ledger.

### Discovery of Opportunity for Padding

Opportunity for padding the payroll, it will be found, frequently exists. This padding may be the increasing of hours or piece work performed or may take the form of carrying dummies on the payroll itself.

It is one of the objects of the audit to discover such instances, the possibilities for them and a means of prevention. An experienced auditor will find this one of the most interesting parts of his work, as the opportunities for padding are so varied and alluring to the wrong-doer.

### Suggestions for Improvement

Suggestions for improvement are necessarily governed by the conditions found, but may be generally classified as follows:

1. Accuracy.

2. Clerical saving.
3. Method employed.
4. Changes in forms.

1. *Accuracy.*

Under accuracy may be mentioned more direct methods of compiling records; checking between time cards and mill records of attendance; elimination of copying a signed approval by the foreman of payroll for his department; the initialing of all deductions or increases showing authorization by the foreman.

2. *Clerical saving.*

Opportunity for clerical saving is abundant where old-fashioned methods govern payroll compilation. It will often be found that it is the custom to have prepared for the office a neatly written payroll record, usually a careful copy of some other preliminary report. Work of this character is largely duplication and open to error.

3. *Methods employed.*

The method of making up the payroll should be investigated in the office to ascertain whether or not records of rates, both time and piece, are in quickly available form for the payroll clerks to use.

The process of putting the currency in envelopes should be reviewed with the idea of simplifying the work.

In the method employed in paying off employees there is an opportunity for suggestion as to the routing of the paymaster and the rotation of paying off, particularly in arranging the employees and their numbers, to avoid delays in the departments.

4. *Changes in forms.*

In reviewing the forms used, it will often be found that the pay sheets themselves can be improved: first, to facilitate departmental divisions for summary purposes; second, to eliminate the re-writing of the names; third, to provide space for deductions and allowances; and, fourth, to provide a means for checking the sheet by column footings.

Time reports, where clock cards are not used, should be so arranged that the original entry comes to the office for use in making up the payroll. Piece record forms should be such that

direct proof may be obtained from production records, either as the product is delivered to the next department or through movement in the department itself.

A form should be provided for making or changing either piece rates or time rates and should be approved by the foreman or the executive who has this in charge.

There are many mechanical devices of assistance in payroll work, such as addressing machines for printing names on the payroll and envelopes, numbering machines, card indexes or visible indexes for rate records, computing tables or calculating machines for making extensions, denominator machines for determining the number of different coins necessary in making up the payroll and automatic change-making machines purposely made for payroll purposes.

### Typical Payroll Audit Procedure

In planning a payroll audit, it should be arranged that at the time of the audit there will be one man to accompany each paymaster and one man to supervise the pay window. If there is only one paymaster, only one man need accompany him, but in the office there should be an auditor to take in charge any pay envelopes remaining and to supervise the paying off at the window.

The auditors should arrive at the plant early on the payroll day and plan their time so that no delay will be experienced by the paymaster in starting his work or in the actual process of paying off. The following is typical of a two-man audit in a plant employing 500 to 1500.

*The procedure.*

The first task is that of comparing the pay envelopes with the payroll and checking on the pay sheet.

One auditor will then accompany the paymaster on his round of paying off. It is this auditor's duty to note the identification of the employees. Where receipt forms are used, the names on the receipts should be compared with the envelopes. Where brass checks are distributed the number should be compared with the number on the envelope.

The auditor will note all irregularities and chances for introduction of dummies or for an employee to repeat or draw pay for another. The general route and method of paying in the plant

should be observed, to form the basis for suggestions for improvement.

All unclaimed envelopes will be taken in charge by the auditor and later be listed as to number, name and amount.

The duty of the second auditor will be to remain in the office in the neighborhood of the pay window and observe the paying off of any employees calling for back pay envelopes. He will also check the pay envelopes against the payroll for the second trip through the plant, provided two or more trips are necessary. He will watch the process of paying off the office assistants and ascertain the methods employed for paying off the night force if it is not feasible to be present when this is done.

After the actual paying off has been accomplished, the auditors will verify the total of the payroll with the amount withdrawn from the bank. They will prove the footings on the payroll and will test the extensions.

The next task is to investigate the method of time-keeping to ascertain if there is a sufficient proof that each employee on day work was in attendance for the full time stated on the payroll. The rates paid to day employees should be verified and the procedure in establishing these rates and the computing of the rates on the payroll should be noted.

The piece records showing the amount produced by operators on piece work should next be reviewed, with such collateral proof as can be found to justify the production claim. The rates for piece work should be investigated and the methods of computing the payroll should be reviewed.

The extensions of the amounts on the payroll are then to be verified, either in detail or by random tests, in accord with the desires of the client.

Throughout the work the auditor will have in view the preparation of the report vouching for the accuracy of the payroll and also the inclusion of suggestions for improvements.

# Process Costs

By Harold A. Eppston

## Introductory

The general manager of an aeroplane motor company informs the cost department that he desires the costs of valve guides by operations. He believes that if he has information of this type he will be enabled to cut the costs by changing the number or order of the operations. But before he can do this he must have costs by operations each month so that he can form his judgments from the changing costs.

Heretofore the cost department found costs for valve guides by jobs.

The cost department welcomes the opportunity for changing the method of costing because the job-order method of costing was unsatisfactory on account of the peculiarities of the production. Because the war programme production in the department where valve guides were made was continuous—day and night shifts worked ceaselessly. The valve guides went from machine to machine in a steady stream. It became impossible to associate each lot of valve guides with a job. The jobs were issued in lots of twenty, but many valve guides would be scrapped or spoiled before completion. As a result there was much guesswork in showing the quantities finished or spoiled on each job. When valve guides came from the last operation to which job did they belong? The question becomes more difficult to answer when we consider that things like the following took place:

A valve guide on operation number 10 is defective. The operative sends it back to operation 2 for correction and at the same time continues working on the rest of the valve guides covered by the job. It is almost certain that the identity of that valve guide will be lost.

Because of the employment of a new man on operation number 5, valve guides begin to accumulate near his machine. The men at operations numbers 6, 7 and subsequent operations are held up.

The foreman gives orders that the valve guides go to operations numbers 6 and 7, then back to number 5, so as to keep everyone working. Here, too, the identity of the valve guides as to jobs is sometimes lost.

In the face of these facts a cost by operations or a process cost was welcomed by the cost department.

*Physical inventory.*

As has been already mentioned the costs of valve guides had been kept by jobs. The change from job costs to process costs takes place October 1st. At midnight September 30th the night shift is stopped and an inventory is taken. Results are as follows:

*TABLE I*

*INVENTORY: VALVE GUIDES, OCTOBER 1*

| *Oper. number* | *Job number* | *Quantity* |
|---|---|---|
| 1 | 234567 | 20 |
| 1 | 234566 | 5 |
| 2 | 234566 | 14 |
| 3 | 234567 | 20 |
| 4 | 234569 | 15 |
| 4 | 234570 | 4 |
| 5 | 234570 | 13 |
| 6 | 234579 | 20 |
| 7 | 234576 | 18 |
| 8 | 234578 | 22 |
| 9 | 234572 | 24 |
| 10 | 234573 | 19 |
| | Total. | 194 |

A glance at the inventory will show how unsatisfactorily the job-order system operated in this case. On operation No. 8 there are 22 valve guides. The job started with only 20. It appears that some unidentified valve guides were thrown against that job. A similar condition exists with operation No. 9 and it is probably true of the rest though not apparent from the quantities.

*Book inventory.*

The cost department clerks pull from their files the open jobs on valve guides. They find the following jobs with the following charges against them.

*TABLE II*

| *Job number* | *Quantity ordered* | *Material* | *Labor* |
|---|---|---|---|
| 234566 | 20 | $ 80.50 | $ 79.01 |
| 234567 | 20 | 80.50 | 80.20 |
| 234569 | 20 | 80.50 | 82.11 |
| 234570 | 20 | 80.50 | 86.07 |
| 234571 | 20 | 80.25 | 90.01 |
| 234573 | 20 | 80.25 | 112.28 |
| 234572 | 20 | 80.25 | 99.09 |
| 234576 | 20 | 80.30 | 120.30 |
| 234578 | 20 | 80.30 | 122.11 |
| 234579 | 20 | 80.30 | 120.06 |
| Totals ..... | 200 | $803.65 | $991.24 |

The differences between quantities ordered and quantities present at physical inventory are the spoiled pieces and, of course, errors due to allocating valve guides to the wrong jobs.

It will be noticed that job 234571 shows a material and labor charge; yet there are no valve guides for this order in physical inventory. This is probably due to carelessness already described. The identity of the valve guides belonging to this order has been lost and they have undoubtedly been picked up by other jobs.

*Operation labor costs.*

To gather costs in the new way, the cost department orders the shop clerks to count all valve guides as they leave each operation and put the quantities on the job labor card of the operative.

The summaries of these job labor cards for October show the following:

*TABLE III*

*LABOR COSTS, OCTOBER*

| *Operation number* | *Quantity* | *Amount* |
|---|---|---|
| 1 | 20 | $ 18.75 |
| 2 | 25 | 20.01 |
| 3 | 20 | 22.02 |
| 4 | 20 | 18.98 |
| 5 | 18 | 20.09 |
| 6 | 17 | 28.03 |
| 7 | 18 | 29.05 |
| 8 | 19 | 24.07 |
| 9 | 20 | 22.17 |
| 10 | 20 | 25.18 |
| | Total. | $228.35 |

*Material charges.*

Summaries of requisitions show that 21 rough valve guides were delivered to the valve-guide department for machining.

*Summary of material issued to work in process October.*

Twenty-one rough valve guides at $4.50=$94.50.

*Overhead.*

The overhead for the valve guide department was $456.70 or 200% of the direct labor. The same rate was used in previous months.

*Final inventory.*

The inventory of valve guides in process at midnight October 31st is as follows:

*TABLE IV*

| *Operation* | *Quantity* |
|---|---|
| 1 | 20 |
| 2 | 18 |
| 3 | 18 |
| 4 | 20 |
| 5 | 13 |
| 6 | 19 |
| 7 | 17 |
| 8 | 19 |
| 9 | 24 |
| 10 | 19 |
| Total. | 187 |

*Spoiled pieces.*

Summaries of spoiled pieces received by salvage department show:

*TABLE V*

| *Pieces scrapped* | *Operation number* |
|---|---|
| 1 | 5 |
| 4 | 6 |
| 3 | 8 |
| Total. 8 | |

SOLUTION

*Material costs.*

From the inventory of valve guides at October 1st, it will be noticed that 194 valve guides were in process. From the book inventory of valve guides October 1st it will be found that against

those jobs in process had been charged 200 valve guides—the total material value being $803.65.

The fact that 200 had been charged to process and 194 are present at the time of physical inventory indicates that 6 valve guides were spoiled prior to the time when the physical inventory was taken. Hence the material cost for the 194 valve guides on hand October 1st is $803.65—thus letting the pieces still good bear the cost of those defective.

Furthermore, the summaries of requisitions show that 21 rough valve guides (value $94.50) were delivered to process during October and that 187 valve guides are left in process October 31st. That eight valve guides were spoiled during October and 20 valve guides were finished during October may be ascertained from the facts given. Material costs are found as follows:

*TABLE VI*

*Material Costs—Valve Guides*

| | *Quantity* | *Unit* | *Value* |
|---|---|---|---|
| Inventory 10/1 | 194 | $4.1425 | $803.65 |
| Charges in October | 21 | 4.5000 | 94.50 |
| Total | 215 | $4.1728 | $897.15 |
| Spoiled in October | 8 | ..... | ..... |
| Adjusted* | 207 | $4.3341 | $897.15 |
| Inventory 10/31 | 187 | 4.3341 | 810.47 |
| Cost of finished pieces | 20 | $4.3341 | $ 86.68 |

* Good pieces bear cost of spoiled pieces.

*Labor costs.*

To ascertain the labor costs by operations for October, it is necessary to distribute over the different operations the labor charges accrued against the valve guides on hand October 1st. How these charges have accrued and what proportion belongs to each operation cannot be determined by the job-order system of costing. Hence, to obtain costs there must be resort to an arbitrary method of prorating such labor over the different operations.

Two methods suggest themselves: first, to prorate the labor

on the basis of facts determined by a time study; second, to prorate the labor on the basis of the actual cost facts of the next period. The latter method is usually the more accurate and it is used here.

Turning back to operation labor costs, we find that the labor costs for October were as follows:

*TABLE VII*

| | *Labor Costs, October* | | |
|---|---|---|---|
| *Operation* | *Quantity* | *Amount* | *Unit operation cost* |
| 1 | 20 | $18.75 | $ .9375 |
| 2 | 25 | 20.01 | .8004 |
| 3 | 20 | 22.02 | 1.1010 |
| 4 | 20 | 18.98 | .9490 |
| 5 | 18 | 20.09 | 1.1161 |
| 6 | 17 | 28.03 | 1.6488 |
| 7 | 18 | 29.05 | 1.6139 |
| 8 | 19 | 24.07 | 1.2668 |
| 9 | 20 | 22.17 | 1.1085 |
| 10 | 20 | 25.18 | 1.2590 |
| | Totals. | $228.35 | $11.8010 |

With the above information as to unit costs for October it becomes possible to prorate over the operations the balance of labor in process October 1st. But first it is necessary to trace the history of the inventory of October 1st over the several operations. The following illustrates how this is done:

From the inventory, valve guides, October 1st, we find the following:

*TABLE VIII*

| *Inventory October 1st* | |
|---|---|
| *Operation* | *Quantity* |
| 1 | 25 |
| 2 | 14 |
| 3 | 20 |
| 4 | 19 |
| 5 | 13 |
| 6 | 20 |
| 7 | 18 |
| 8 | 22 |
| 9 | 24 |
| 10 | 19 |
| Total. | 194 |

It is evident that the valve guides on operation No. 10 must have passed through the previous nine operations. Those on operation number 9 must have traveled through the previous eight operations, and so on.

The following table shows the history of the above inventory by operations:

*TABLE IX*

*Inventory Valve Guides by Operations, October 1st*

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | | | | | | | | | | |
| 14 | 14 | | | | | | | | | |
| 20 | 20 | 20 | | | | | | | | |
| 19 | 19 | 19 | 19 | | | | | | | |
| 13 | 13 | 13 | 13 | 13 | | | | | | |
| 20 | 20 | 20 | 20 | 20 | 20 | | | | | |
| 18 | 18 | 18 | 18 | 18 | 18 | 18 | | | | |
| 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | | | |
| 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | | |
| 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 0 |
| 194 | 169 | 155 | 135 | 116 | 103 | 83 | 65 | 43 | 19 | 0 |

The above table merely shows that the 19 pieces on operation number 10 had passed through the 9 previous operations, etc. As a result the inventory of October 1st is shown by operations.

Assuming, as already indicated, that the operation costs prior to October 1st were identical with those of October, we can get a table as follows:

*TABLE X*

*Bases of Prorating Labor Over Operations October 1*

| *Operation* | *Quantity* | *Unit* | *Total* | *%* |
|---|---|---|---|---|
| 0 | 194 | ..... | ..... | ..... |
| 1 | 169 | $ .9375 | $158.44 | 16.2 |
| 2 | 155 | .8004 | 124.06 | 12.7 |
| 3 | 135 | 1.1010 | 148.64 | 15.2 |
| 4 | 116 | .9490 | 110.08 | 11.3 |
| 5 | 103 | 1.1161 | 114.96 | 11.8 |
| 6 | 83 | 1.6488 | 136.85 | 14.0 |
| 7 | 65 | 1.6139 | 104.90 | 10.7 |
| 8 | 43 | 1.2668 | 54.47 | 5.5 |
| 9 | 19 | 1.1085 | 21.06 | 2.6 |
| 10 | 0 | 1.2590 | ..... | ..... |
| Total.... | ... | $11.8010 | $973.46 | 100.0 |

It will now be noticed that if the costs of labor by operations for the period prior to October 1st were identical with such costs for October the total amount above $973.46 would be equal to the inventory of labor October 1, 1919. However, by looking back we find that the inventory of labor at October 1st was $991.24, or $17.78 more than the above. This difference exists because the operation costs prior to October 1st must have been greater than those of October. This difference, therefore, must be prorated over the amounts already set against the operations at October 1st.

The following table illustrates how this may be done:

*TABLE XI*

*Inventory of Labor October 1 by Operations*

| *Operation* | *Quantity* | *Total* | *%* | *Adjustment* | *Final* |
|---|---|---|---|---|---|
| 0 | 194 | ..... | .... | .... | ..... |
| 1 | 169 | $158.44 | 16.2 | 2.88 | $161.32 |
| 2 | 155 | 124.06 | 12.7 | 2.26 | 126.32 |
| 3 | 135 | 148.64 | 15.2 | 2.70 | 151.34 |
| 4 | 116 | 110.08 | 11.3 | 2.01 | 112.09 |
| 5 | 103 | 114.96 | 11.8 | 2.10 | 117.06 |
| 6 | 83 | 136.85 | 14.0 | 2.49 | 139.34 |
| 7 | 65 | 104.90 | 10.7 | 1.90 | 106.80 |
| 8 | 43 | 54.47 | 5.5 | .98 | 55.45 |
| 9 | 19 | 21.06 | 2.6 | .46 | 21.52 |
| 10 | .... | ..... | .... | .... | ..... |
| Total.. | ..... | $973.46 | 100.0 | 17.78 | $991.24 |

Now it is possible to get the true labor costs for October. But first it is necessary to obtain a statement showing the defective pieces by operations. This statement (table XII) has the same relation to table V as table IX has to table VIII.

*TABLE XII*

*Statement of Defective Pieces by Operations, October*

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | | | | | | | |
| 4 | 4 | 4 | 4 | 4 | 4 | | | | | | |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | |
| 8 | 8 | 8 | 8 | 8 | 7 | 3 | 3 | 0 | 0 | 0 | Total |

The following statement shows the labor costs for October:

*TABLE XIII*

*Final Labor Costs by Operations, Valve Guides, October*

| Operation | Inventory October 1 Quantity | Amount | Changes in October Quantity | Amount | Total Inv. & Changes Quantity | Amount |
|---|---|---|---|---|---|---|
| 0 | 194 | ..... | 21 | ..... | 215 | ..... |
| 1 | 169 | $158.44 | 20 | $18.75 | 189 | $177.19 |
| 2 | 155 | 124.06 | 25 | 20.01 | 180 | 144.07 |
| 3 | 135 | 148.64 | 20 | 22.02 | 155 | 170.66 |
| 4 | 116 | 110.08 | 20 | 18.98 | 136 | 129.06 |
| 5 | 103 | 114.96 | 18 | 20.09 | 121 | 135.05 |
| 6 | 83 | 136.85 | 17 | 28.03 | 100 | 164.88 |
| 7 | 65 | 104.90 | 18 | 29.05 | 83 | 133.95 |
| 8 | 43 | 54.47 | 19 | 24.07 | 62 | 78.54 |
| 9 | 19 | 21.06 | 20 | 22.17 | 39 | 43.23 |
| 10 | 0 | 0 | 20 | 25.18 | 20 | 25.18 |
| Total | 194 | $973.46 | 21 | $228.35 | 215 | $1201.81 |

| Adj. Spoilage | Adjusted Quantity | Amount | Unit Cost | Inventory October 31 Quantity | Amount | Completed Quantity | October Amount |
|---|---|---|---|---|---|---|---|
| 8 | 207 | ..... | ..... | 187 | ..... | 20 | ..... |
| 8 | 181 | $177.19 | $.9789 | 161 | $157.61 | 20 | $19.58 |
| 8 | 172 | 144.07 | .8376 | 152 | 127.32 | 20 | 16.75 |
| 8 | 147 | 170.66 | 1.1609 | 127 | 147.44 | 20 | 23.22 |
| 8 | 128 | 129.06 | 1.0079 | 108 | 108.90 | 20 | 20.16 |
| 7 | 114 | 135.05 | 1.1846 | 94 | 111.36 | 20 | 23.69 |
| 3 | 97 | 164.88 | 1.6998 | 77 | 130.88 | 20 | 34.00 |
| 3 | 80 | 133.95 | 1.6744 | 60 | 100.46 | 20 | 33.49 |
| 0 | 62 | 78.54 | 1.2668 | 42 | 53.21 | 20 | 25.33 |
| 0 | 39 | 43.23 | 1.1084 | 19 | 21.06 | 20 | 22.17 |
| 0 | 20 | 25.18 | 1.2500 | 0 | 0 | 20 | 25.18 |
| 8 | 207 | $1,201.81 | $12.1783 | 187 | $958.24 | 20 | $243.57 |

Reference to table XIII will show that both quantities and values check mathematically—that is, the inventory October 1st, plus charges for October, less deductions for spoilage, equals the total inventory October 31st, plus cost of finished pieces. This is true both of quantities and values.

To obtain overhead costs in this case all that is necessary is to set up a table similar to table XIII and multiply all values by 200%. However, if the overhead rate varied from one cost period to another the table would have to be worked out in detail.

The following is a summary of the costs per valve guide finished during October:

*TABLE XIV*

*Summary—Cost Per Valve Guide, October*

| *Operation* | *Material* | *Labor* | *Overhead* | *Total* |
|---|---|---|---|---|
| 0 | $4.3341 | $ ..... | $ ..... | $ 4.3341 |
| 1 | ..... | .9789 | 1.9578 | 2.9367 |
| 2 | ..... | .8376 | 1.6752 | 2.5128 |
| 3 | ..... | 1.1609 | 2.3218 | 3.4827 |
| 4 | ..... | 1.0079 | 2.0158 | 3.0237 |
| 5 | ..... | 1.1846 | 2.3692 | 3.5538 |
| 6 | ..... | 1.6998 | 3.3996 | 5.0994 |
| 7 | ..... | 1.6744 | 3.3488 | 5.0232 |
| 8 | ..... | 1.2668 | 2.5336 | 3.8004 |
| 9 | ..... | 1.1084 | 2.2168 | 3.3252 |
| 10 | ..... | 1.2590 | 2.5180 | 3.7770 |
| 10 | $4.3341 | $12.1783 | $24.3566 | $40.8690 |

# The Pricing of Inventories

By J. Paul Suter

In the old days, every butcher shop had a number of customers who specialized on buying dog meat. They were mostly old ladies—dear old souls, highly refined, indisputably aristocratic, but rather short of cash. They usually brought Fido with them; and they were careful to point out to the butcher that, because of the delicate state of Fido's stomach, only fresh dog meat could be considered. The butcher was sympathetic. He understood. The scraps which he handed out to the old ladies were fresh, and sometimes they were more than scraps; and he was careful never to breathe his suspicion that the benefit derived by Fido from the meat was mainly aesthetic. He winked at the guileless fraud whereby the old ladies lived, and in doing so he furthered a rather odd economic paradox: to wit, that an old lady and her dog could subsist more cheaply than the same old lady without the dog.

Now, this has nothing to do directly with the pricing of inventories. Indirectly, it has quite a vital connection. It is a paradox. So are many inventories, as priced by reputed accountants at the end of each half-year. It was an expedient, on the part of the old lady. So is an inventory value, when it is twisted to what the executives of a company desire it to be and the principles of sound pricing are ignored. Above all, there is a way of making paper profits by taking inventories instead of by selling goods. In such cases, the executive who revels in the "good" statement he has thus obtained is the old lady, and surely the hoodwinked stockholders, whose profits never quite reach their hands, are in the position of expectant but disappointed Fido. One other comparison might be noted in the fact that the good old days came to an end; and just as inevitably must halcyon days vanish and stark hard times appear for any manufacturer (or, indeed, for any one else) who persists in ignoring the truth.

How, then, should an inventory be priced? "At cost or lowest market, whichever is less," answers the accountant. We cannot gainsay him, nor shall we find much ground for argument if conditions happen to indicate the market price. We may inquire,

however, as to the meaning of cost in its application to inventories.

Assuming that the costs are determined correctly (for we are not trying to cover the broad field of cost finding) we still are left in the dark as to what costs should be used. Shall they be this month's costs, or last month's, or those for the month before? "Oh, the latest costs, by all means," answers a whole school of pseudo-accountants. Very well; but here I have a thousand tons of a certain article on hand. Last month, I produced a hundred tons, and, because of the small production, it cost me the high price of fifteen dollars per ton. The month before, with a production of seventeen hundred tons, I rejoiced in the low cost per ton of eleven dollars. Shall I price my thousand tons at fifteen dollars, when I know well that nine-tenths of it was produced at eleven dollars? If I do, I shall add thirty-six hundred dollars to the paper profits for the period I am covering, without having an honest penny to show for any of it. Shall I not, rather, if I am thinking straight, price one hundred tons of my inventory at fifteen dollars, and the remainder at eleven?

I shall not be using the latest cost. I shall be using the cost of the latest production equivalent to the inventory I am pricing.

This is the simple statement of a law that has almost universal application in the pricing of inventories. Substitute the word receipts for production, and the rule is extended to cover raw materials and all other supplies that are purchased by a manufacturer instead of produced by him—always provided, of course, that the cost thus determined is not higher than the market.

It will be objected that, under some conditions, this rule would be impracticable of application. Suppose, for example, that my thousand tons represented only one item in an inventory of more than five hundred products of my manufacture, and that many of the items were equivalent to the productions of several months. The task of analyzing each item, so as to obtain a price by applying against the inventory precisely the adequate equivalent in production, would be considerable. True, such a task might be well repaid in the information it would afford as to slow-moving materials in the inventory; yet there is an easy way of avoiding so much labor. That way is to use an averaging process at the end of each month or other cost period, and to compute the cost

of goods sold by using first the balance at the beginning of a month, then enough of the current production to equal the quantity sold, if that quantity exceed the first-of-the-month's balance. Of course, if the quantity sold should be less than what was on hand at the first of the month, the cost of the entire sales would be computed at that first-of-the-month price. In the first instance, the price of the inventory at the end of the month would be the same as that of the current production. In the second instance, the inventory would consist of the entire current production, plus what was left of the balance on hand at the beginning of the month, and as a consequence the inventory price would be somewhere between that of the production and that of the previous balance.

Put abstractly, this operation sounds rather complicated. Really, it is absurdly simple. The small boy who has five green apples and then buys ten rosy-cheeked apples is proceeding according to the above practice the minute he decides that he will eat the five green apples first. Being informed of his decision, if we are told that he has twelve apples left, we know at once that this number must consist of two green and ten rosy-cheeked apples. If, however, the remainder of his stock consists of only seven apples, we are equally certain that these must all have rosy cheeks. All that we need in order to arrive at the value of his "inventory," and, incidentally, at his cost of consumption, is the price that he paid for each of the respective lots of apples.

If, to our minds, apples are apples, and we do not care to distinguish the green from the rosy-cheeked in our inventory, we shall use the same method regardless of which kind of apples is eaten first. As soon as five apples are gone, we shall consider that the value of the green fruit has been subtracted from our records; conversely, we shall carry the ten apples that are left at the cost of the ten that had rosy cheeks, and we shall not care how many of them are green.

This is not inaccuracy; it is common sense. I can not carry apples and potatoes, nor pig iron and bessemer ingots, indiscriminately in the same inventory account; but if, for merchandising purposes, my apples are alike, and it makes no difference of selling price or quality which ones I sell first, why should I trouble myself with the intimate history of each piece of fruit,

or of each bushel of potatoes, or ton of pig iron or ingots? Let me keep in separate accounts such items as should be distinct; then, once I have assigned an article to its proper group, I may safely lose sight of its identity.

Proceeding further, if I compute my manufacturing costs in monthly periods, what shall I gain by going back of the beginning of the month to analyze the make-up of my inventory items? That first-of-the-month balance necessarily stands at an average price I am justified, then, in treating it as an integral quantity. If my quantity sold equals or exceeds it, well and good—it is gone. If I sell less than the quantity at the beginning of the month, what I have left of it simply joins with my current production or receipts to produce a quantity, at an average price for the two, which will be my inventory at the end of the period.

Some manufacturers, perhaps. may consider it advisable to keep the inventory analyzed each month, and to use strictly the oldest production first, but in most concerns, especially those of any great size, such a practice will not justify the labor required to carry it through.

A hearing must be given, however, to the man who inquires, "Why use the previous balance first? Why not first use the production or the receipts?" Two answers occur, at once: one, that the use of the previous balance, before the production is touched, automatically brings the inventory down to date, so that at all times the stock on hand is priced in accordance with the latest equivalent production; the other, that this plan enables one set of clerks to compute the cost of sales on all articles where the quantity sold is less than or just equal to the previous balance, while another set of clerks is determining the cost of the current production. When the number of distinct inventory accounts runs into the hundreds, this second consideration has a good deal of weight.

It is well to note, however, that special conditions may indicate a variation from the above practice. For example, a persistently rising cost of manufacture may make it advisable to use the current production first. During the great war, one of the largest corporations in America instructed its cost accountants to use either the previous balance or the current production first, whichever was the higher in price. This practice delayed

the closing of the corporation's books, but it resulted in a conservatively priced inventory. That the precarious conditions of war time, with the probability of a declining market, justified such a course hardly any one will deny. This practice has much the same effect as would have been produced by setting up a reserve for shrinkage of inventory values. In a period when all costs were abnormally high, and when the future was even more obscure than at ordinary times, such a procedure was eminently wise.

We do not insist, then, that the previous balance must be used first; but we are willing to stand or fall by the statement that the equation

> Previous balance + production and receipts=
> Cost of sales (or of consumption) + balance at the end of the period

should be maintained at all times. This is merely another way of stating that the credits should equal the debits—which is hardly a revolutionary opinion to express. It seems fairly obvious, also, that the price of the inventory at the end of the period must be that of the previous balance or that of the production (or the receipts), or else must be a figure somewhere between the two. When we have gone still further by applying the same rule to the cost of goods sold or consumed, the trail has begun to be well defined.

The subject is not adequately covered, however, until some reference has been made to the reasons for discrepancies between actual inventories and book figures. Such shortages or overages often have a material bearing upon the price at which an inventory should be carried.

It will be found that these differences almost invariably arise from some one or some combination of the following conditions:

(1) Actual physical shortages or overages, due to theft, loss, seepage, etc.

(2) Errors in the book records, such as
- (a) Invoices taken into account twice;
- (b) Material received, but no invoices taken into account;
- (c) Inaccurate production reports;

(d) Material sold or otherwise disposed of, without being deducted from the inventory records;
(e) Mechanical errors in adding, deducting, posting to wrong accounts, posting wrong quantities, etc.
(f) Errors in the previous inventory;
(g) Errors in the current inventory.

(3) Physical shrinkages or increases in the materials inventoried, due to drying out, absorption of moisture, chemical changes, etc.

The manner of handling most of the differences arising from the above causes is self-evident, in so far as they relate to the pricing of inventories. Errors in the book records should be corrected, as a matter of course, and these corrections should be considered in finding a price for the balance. If quantities produced have been reported wrongly, it must be borne in mind that under a manufacturing cost system, any change in the number of units produced changes the cost per unit and thus affects the price of the inventory. The error may not be sufficient to warrant all the labor of reworking the costs, but any steps taken to ignore it should come about as the result of deliberate decision, and not through oversight.

Another rather obvious point, but one nevertheless that should be mentioned, is that the price of the book balance may be absolutely correct, and yet may not be the price to use on the actual inventory. Suppose—to quote one of several conditions that might result in this seeming paradox—that, though the book balance of some certain commodity is equivalent to, say, two months' production, a physical inventory discloses that, owing to a genuine but hitherto undiscovered shortage, the quantity actually on hand is less than that produced in the latest month. Under the rule usually followed of "using the previous balance first," the inventory will be carried at the price of the production for the latest month; and yet the book balance should not be, and probably will not be, at that price.

Still another special condition may be brought about by actual physical shrinkage in materials inventoried. It is perfectly possible that I may have on hand in one inventory a thousand pounds of some fluctuating substance, and that, without my having used or otherwise disposed of any of it, I may find only

nine hundred and fifty pounds of that substance on hand in the next inventory, the weight reduction having been caused by natural drying out of the material. Clearly, the smaller quantity is worth as much to me in total as the larger—in fact, the cost of the drying process may make it worth more. Yet, to one unacquainted with the peculiar conditions in my industry, I shall have achieved somewhat the same economic paradox as did the old lady and her dog.

Indeed, I may go that one better. I may have in my inventory a valuation with no quantity whatever against it, and still not be outlawed. This condition comes about sometimes where expense of a given kind is applied to certain materials, while other like materials go directly into the production without the necessity for any such expense. In certain industries much cost bookkeeping is saved by carrying this "inventory expense," as it may be termed, in a different account from the materials to which it applies, those materials being combined in the accounts with others of like nature that are used without special treatment. As the specially treated materials are used, the expense applicable to them is written off to its proper production channel. This is somewhat of a side lane, which does not call for more than passing mention, but it illustrates an interesting exception to the usual inventory procedure.

A good many other side lanes might be entered, and crooked by-paths, too, but in the end they would lead to the same conclusion, which is, that the pricing of inventories is a matter for common sense. It is a matter, also, in which the most rigid honesty pays best in the end—not commercial and financial honesty only (if indeed they differ from other sorts) but that highest kind of intellectual honesty which compels a man to face the facts squarely and write them down truthfully for what they are.

# Computation of Coupon Values

By Arthur S. Little

During the sound money campaign of 1896 there were distributed by the Republican national committee and other organizations, countless tons of educational literature; most of which was written or inspired by the brightest and ablest financiers and economists of the country. Among the numerous excellent tracts and pamphlets of this nature that came to my notice that which impressed me the most deeply, and I considered the best of all, was one with an artistically executed colored border of appropriately emblematical serpents, wherein the author urged the early and permanent retirement of the $346,000,000 "greenbacks," that were then and are still outstanding, and most ably defended the proposition that they had already cost the country many times what they had saved in interest on a funded loan, and that the fundamental idea upon which they were based, viz, that monetary wealth can be created with printing presses and a government's fiat, was the real cause of all the troubles from which we were then suffering and the evils with which we were menaced.

In a somewhat similar manner I have often thought, and do still think, that nearly all, if not all, the ignorance and misunderstanding that exist, with the resultant mischievously defective accountancy of transactions in and ownership of the ordinary type of investment—bonds of solvent municipalities and corporations—are due entirely to the fallacious belief that the coupons attached to such bonds are or represent or at any rate have something to do with interest on the capital that was borrowed by the issuer and invested by the purchaser and are therefore in an entirely different category from what is commonly designated as the par or face value, which in reality is merely coupon 41, 81 or 101, as the case may be, and is usually for from 50 to 33⅓ times as large an amount as all the others that preceded it, and payable on the same day as 40, 80 or 100. (This assertion refers solely to abstract accounting principles underlying actuarial work in transactions in or the distribution of earnings from prompt-paying

investment securities. I am well aware that, in the present state of enlightenment at least, a sharp distinction may exist under unusual conditions, e. g. bond calls, foreclosures, enforcement of guarantees, action by protective committees, etc.)

My views upon this subject are well covered in the article I contributed to this magazine in September, 1915, *The Tyranny of the Engraver* and on the present occasion I propose to assail merely the widely entertained belief that interest accrues on a bond between coupon dates on the par of the bond at a rate per annum obtained by dividing the sum of any two interest coupons attached thereto by said par—impulse having been afforded by the following:

".....interest accrued on bonds purchased is not a part of the cost of the bonds, but is a temporary advance to be reimbursed from the current coupons when they become due. The entry, therefore, is a charge to investments at whatever is paid for the bonds themselves, and to interest for the amount of the accrued interest paid."—THE JOURNAL OF ACCOUNTANCY, October, 1918, p. 318.

To begin, let us try a simple case wherein we assume that the interest accrued on bonds purchased is a part of the cost of the bonds—in other words, that the investor invests what he pays out—and see how it works. A bargain is struck whereby $1,000,000 7s, with 1¾ years to run, are sold upon terms to net the investor exactly 2½% semi-annual interest for the entire time. As no suitable bond tables happen to be available, the proper amount to be paid is ascertained by the same method that would have been employed on a coupon date, viz, by finding the present worth of the post-due negotiable instruments that constitute the bond, as follows:

$$\frac{\$1{,}000{,}000}{(1.0125)^{3.5}} + \frac{\$35{,}000}{(1.0125)^{3.5}} + \frac{\$35{,}000}{(1.0125)^{2.5}} + \frac{\$35{,}000}{(1.0125)^{1.5}} + \frac{\$35{,}000}{(1.0125)^{.5}}$$

$$= \$1{,}094{,}030.55.$$

| | |
|---|---|
| which sum the investor pays for the bonds and puts on his books as the amount of the investment..... | $1,094,030.55 |
| Three months later he charges the investment and credits his interest account with three months' semi-annual interest at 2½% (.623059%)..... | 6,816.46 |
| | $1,100,847.01 |

| | |
|---|---|
| The same day the investment is credited and cash charged with the proceeds of a coupon that is collected..... | 35,000.00 |
| New investment value ..... | $1,065,847.01 |
| Six months later a half-year's interest is charged (1.25% of balance) ..... | 13,323.09 |
| | $1,079,170.10 |
| Less coupon ..... | 35,000.00 |
| | $1,044,170.10 |
| | 13,052.13 |
| | $1,057,222.23 |
| | 35,000.00 |
| | $1,022,222.23 |
| | 12,777.78 |
| Investment value on day bond and last coupon are due..... | $1,035,000.01 |

It looks very much, therefore, as though this investor invested what he paid out, viz, $1,094,030.55;

that it was all repaid to him within 1¾ years;

and that during that time he earned 2½% semi-annual interest on every penny that he invested.

Simple as this is, very few seem to appreciate the importance and indispensability of sound accountancy, through which this interest was earned, obtained, secured, collected, received, etc. If this investor had followed the usual custom of relying exclusively upon a pair of scissors for the collection of the income specified, he would not have earned interest in any sense of the word. He would simply have made a profit of $45,969.45 resulting from paying $1,094,030.55 for the bond and coupons and later retailing them for $1,140,000. But by correct accounting practice the interest for, say, the first three months, was collected and made available for investing a balance-sheet with gratifying qualities, being spent, handed over to living heirs, etc., through an exceedingly important journal entry whereby interest account was credited and this investment charged with the previously ascertained correct amount of $6,816.46. The immediate effect, it should be noted, is a material inflation of the book value of the investment, and, as far as the question of the soundness of such

inflation is conecrned, it is totally immaterial how soon it will be wholly or partly undone by cash deposits made by this investment for its credit. For example, in the case of bonds with annual coupons when the interest is taken at the usual semi-annual interval, the inflated value is carried for six months. The important point is that every one of these charges made to this investment will in due course be paid in full in cash, together with compound interest on balances; hence the asset represented by the swollen account is as good as it could possibly be and is comparable to a well secured broker's account, with this favorable distinction: that definite foreknowledge exists regarding amounts and dates of the deposits that are eventually to extinguish the account.

I am still decidedly of the opinion that the foregoing is the only correct aspect of the subject of income from bonds and similar securities, and that, until such doctrine is duly recognized and observed, very little progress will be made in the accountancy of investment of other people's money.

But, according to the dictum above quoted, $17,500 of the $1,094,030.55 is a temporary advance, to be tucked away for the next 90 days in the inanimate unproductive interest account, while whatever is paid for the bonds themselves—in this case presumably $1,094,030.55—$17,500=$1,076,530.55—is a charge to investments.

After getting started with such expert advice, therefore, the bank or trust officer who bought these bonds (very likely with the money of others) is hardly to be blamed for crediting interest account with $35,000 three months later, and thereupon consulting the ticker or awaiting the bullying edict of some politician at Harrisburg or Montpelier in order to ascertain how much of the book value he should write off.

Except in rare cases which have no bearing on the subject under consideration, bonds are bought only for the income they will yield. When the latter is what is agreed upon between the buyer and seller, what is given for the bonds is, as in the example just cited, an ascertained sum of money, which in turn is the present worth of the various negotiable instruments for fixed sums payable at specified dates that constitute the bond. When, as is frequently the case, the bonds are bought at a price—e. g. 102⅞

and interest, par and interest, etc.—a sum of money is paid for a collection of negotiable instruments amounting to what they do and maturing when they do, and the rate of interest that will be earned may be ascertained later to any degree of precision desired. The only difference, therefore, between bonds sold "on a basis" and "at a price" is merely that the unknown quantity has been shifted to another element of the equation; but in either case the important fact remains that the sum of money paid for the bonds is the present worth of the bonds and coupons at some fixed rate. Therefore, while there is nothing immoral or unsound in the fact that a dealer or holder sells and an investor buys $100,000 6s, with 49.7778 years to run, at 129¾ and accrued interest—the latter acting on the honest conviction that the bonds are a bargain at that price—nevertheless what he really does is to pay $131,083.33 for $400,000 non-interest-bearing notes maturing at various dates during the next 50 years, knowing from experience and knowledge acquired from consulting basis books that such a set of notes for that amount and maturing as they do, if bought today for a sum of money indicated by taking 129.75% of the face value of the largest and last maturing note, plus 80/180 of the first maturing note, would yield a rate of income that would be satisfactory to him, to wit, 4½%.

The foregoing quotation is found in the *Students' Department* and is part of the reply to an inquirer who has bought bonds at par and interest. No figures are given as to rates, amounts and dates; so let us assume, for example, that the purchase consisted of $100,000 annual 7s with nine months to run. The bill of the bond dealer of course reads:

| | |
|---|---|
| $100,000 A., B. and C. 7s at par..... | $100,000.00 |
| Accrued interest to date, 90 days at 7%..... | 1,750.00 |
| | $101,750.00 |

which is as correct as it can be as far as business methods are concerned. But in the name of sound accountancy I certainly protest against the further dissemination in the columns of this magazine of such puerile and pernicious doctrines as:

> that of the $101,750 that this investor laid out, $100,000 only was an investment; $1,750 thereof being a temporary advance to be charged up elsewhere.

This man gave $101,750 for $107,000 to be received nine months hence, whereby he earns 6.87907% simple interest or 6.8217628% if reduced to standard interest with semi-annual compounding.

The amount of unity at 6% compounded semi-annually is:

| *Years* | *Amount* |
|---|---|
| 0 | $1.00 |
| ½ | 1.03 |
| 1 | 1.0609 |
| 1½ | 1.092727, etc. |

Upon attempting to find, by interpolation, to what this $1.00 has grown at the end of three months we obtain $1.01488916, which, if correct, should be $(1.03)^{½}$. It is correct—the square root of 1.03 to 12 places being 1.01488915651. Similar success is obtained in attempting to find the present worth of unity for ¼, ¾, 1¼, etc. years, from which we are warranted in concluding that we may safely depend upon interpolation to take care of semi-annual compounding for periods that are not multiples of the half-year.

If the values for, say, ½ to 50 years shown in the tables for this 7% bond to yield 2½%, be investigated, either mathematically or mechanically (by proper plotting on profile paper), it will be found that they constitute a series, suggesting that interpolation may be employed. The tables, which all parties (except the misguided members of the reinvestment school) acknowledge to be correct, show 106.58 for 1½ years; 108.73 for 2 years; 110.84 for 2½, etc.; hence it would seem that the value for 1¾ years must lie between those for 1½ and 2 years. Now, while this 2-year value of 108.73 is the present worth at 1¼% per half-year, compound discount, of the parent bond and four coupons of $35,000 each, the value for 1¾ years is also the present worth of the same bond and four coupons; and as they are now all payable 3 months sooner, their present worth is of course greater. In fact, as we have already noted, it is $1,094,030.55. But by the application of interpolation we obtain $1,076,584.90 as a bond value for 1¾ years, differing from that obtained by the present-worth process, which stood the test of being multiplied down to maturity, to the extent of $17,445.65. As the bond at 1¾ and at 2 years has four coupons thereon and only three at 1½ years,

this discrepancy is undoubtedly connected with the $35,000 coupon that disappears when the 1½ year stage is reached; moreover it is suggestively close to the $17,500 accrued interest that is supposed to be on the bond mid-way between coupon dates. But this $17,445.65 is not 3 months' growth on $1,000,000 @ 7%, as that, with semi-annual compounding, would be only $17,349.50. Still less is it the present worth of the maturing coupon at either 2½% or 7%; nor is it 3 months' interest at either of these rates on the 2-year value. As this $17,445.65 does not appear to be "interest" obtainable through any plausible elements at hand, let us leave it for the time being and investigate at another period when the bond had longer to run. At 19¾ years the present worth of the bond and 40 coupons is $1,715,478.26 and the interpolated value between 19½ and 20 years is $1,698,032.61; yielding the same discrepancy as before, notwithstanding that the premium is about 62 points greater, and, what is still more significant, the first difference employed in interpolating is decidedly less. Further experiments at ¼, 9¼, 15¾, etc., years yield this same constant discrepancy—hence we are justified in concluding that it is not a fortuitous odd amount, but on the contrary a constant quantity, dependent upon some fixed law and possessing interesting and important significance.

We now experiment at another income rate, say 3%, and find that the accrued interest has shrunk to $17,434.85.

At 3½% it is $17,424.10
at 4%, $17.413.36
and at 4½%, $17.402.65.

Further experiment is unnecessary, as it is now plainly apparent of what this discrepancy between the bond values obtained respectively by interpolation and the present-worth plan consists. It is an imaginary or theoretical coupon. All the tabular bond values that were employed in interpolating were for the occasion when the current coupon had just matured and been detached and paid—hence the same situation must exist with regard to a value for an intervening occasion when such value has been obtained in accordance with the law of the series of values at regular coupon dates, as given in the tables.

In order to view the subject from another standpoint, let us assume that this issue of 7s that we have been considering was

originally sold by a railroad company on a 7% basis (in other words, at par) and that during the last 30 years or so the bonds have fluctuated considerably in the market, due to changes in money rates and a material improvement in the road's credit, at times selling as high as a 2½% basis. Let us assume further that the various bondholders get together and for certain good reasons of their own request the railroad to take up the original bonds and issue in lieu thereof bonds similar in all respects except with quarterly instead of semi-annual coupons. The bondholders offer to bear the cost of engraving, and the railroad officers assent to the proposition on the condition that it be carried out in a strictly equitable manner in accordance with scientific actuarial principles—in other words, that the two quarterly coupons shall constitute a true equivalent for the original semi-annual coupon. As all existing conditions are to remain undisturbed except the frequency of the payment, it is hastily and not unnaturally concluded by all parties concerned that the proposed change is a very simple one—nevertheless it soon develops that the idea is altogether impracticable and will have to be abandoned. The railroad officers find that the loan is costing 7% semi-annually—hence the only quarterly coupon that spells equity to them is one for 1.73495%. In a similar manner, one of the bondholders who bought at 124 to net 4% requires a coupon for 1.741336%. Another bondholder who bought at 194 to yield 2½% can only accept a coupon for 1.744565%, etc.; in short, there would be required as many different sized quarterly coupons as there were income bases upon which the various bondholders had made their respective purchases.

This phase of bond value phenomena is somewhat similar to a rainbow that is observed by various scattered inhabitants of a large city. The essentials, consisting of one sun shining behind the observers and one shower in front of them, are common and constant; nevertheless each observer beholds his own special bow with its individual particular light rays, angular magnitude and position upon the celestial sphere.

In the article, *The Tyranny,* I laid down the doctrine that when bonds were held as an investment, the debtor owing to the investor was "this investment," personified, to which certain critics have objected, claiming that the only person or thing owing any-

thing to the investor was the individual, municipality or corporation that had issued the bonds and coupons he had bought and would pay them when they became due. A new line of thought is certainly afforded by the foregoing investigation. The seemingly anomalous situation, whereby the railroad owes $1,000. per bond, costing 7% interest and on the same day one individual owning one of the self-same bonds has $1,808.46 owing to him earning 2½% interest, is attributable to the indefinite amount of trading that has in the meanwhile taken place in the bonds of this issue. Some of the original purchasers have no doubt made handsome profits in addition to 7% interest on their investment, and other transient holders may have incurred heavy losses through having bought and sold on unwisely selected occasions, but this is of no concern whatever to the railroad, which at all times owed a uniform sum to this loan at 7% interest; and, although during the life of the bonds millions of dollars might be made and lost through change of ownership, the railroad company is not concerned in the slightest degree and would be no worse nor better off for being in total ignorance of the existence of all these changes in ownership and fluctuations in price. In a similar manner, an investor who buys at 180.84 when the bonds have 24 years to run is not concerned in the least with what the railroad originally received, or what has been made or lost by those who have owned the bonds prior to his purchase. All he knows or needs to know is that he has invested $1,808.46, $18,084.58, $180,845.83, etc., for 24 years, and that, attended by substantial and steadily increasing semi-annual payments on principal he will earn 2½% semi-annual interest on what he has invested—provided he keeps books and makes proper entries at least as frequently as whenever a coupon is collected.

The method whereby the amount of an equivalent shorter coupon was found as a "discrepancy" is a clumsy, roundabout process; and it is now in order to devise a formula whereby direct calculation may be made for any frequency interval. Suppose a case where the coupons are to be increased from two to six. Denoting

Actual coupon by C
Short coupon by c
Semi-annual ratio by R

60-day ratio by r
Any semi-annual value by V
Value, ex-coupon, 2, 4 and 6 months thereafter by V', V'' and V'''
then:

(1) $VR - C = V'''$
(2) $Vr - c = V'$
(3) $Vr^2 - rc - c = V''$
(4) $Vr^3 - rc^2 - rc - c = V'''$

As $r^3 = R$, we have from equations (1) and (4)

$$C = r^2c + rc + c$$

from which it will be found that $c = \frac{C(r-1)}{(R-1)}$ or

$$\text{Odd coupon} = \frac{(\text{real semi-annual coupon})\ (\text{odd rate})}{\text{semi-annual rate}}$$

*Example:* A trust company is the owner of a $100,000. 4% loan that was bought some years before at a price to yield 5%. The maker of the loan desires to take up the semi-annual "interest notes" originally uttered and to substitute a new set payable at 45-day intervals, to which the trust company assents. Required, the amount of the new coupons.

$$\frac{\$2{,}000. \times .00619225}{.025} = \$495.38.$$

PROOF

| | |
|---|---|
| Value at, say, 17½ years | $88,427.42 |
| Forty-five days' interest at 5% | 547.56 |
| *Less coupon* | *495.38* |
| | $88,479.60 |
| | 547.89 |
| | *495.38* |
| | $88,532.11 |
| | 548.21 |
| | *495.38* |
| | $$8,584.94 |
| | 548.54 |
| | *495.38* |
| Book value for 17 years, tallying with bond tables | $88,638.10 |

In view, therefore, of all the loose talk that has been and still is heard in various circles (as well as sundry standard tables and text-books) about "bonds with interest payable quarterly"; "bonds bearing interest at the rate of"; "total cash interest"; "surplus interest"; "deficient interest," etc., it is indeed refreshing to turn to an unpretentious little text-book, *Interest and Bond Values* published at Toronto in 1912 by M. A. Mackenzie of that city, and find nothing but such phrases as:

"the ability of the issuing corporation to earn the annual coupon payments."
"a bond due 20 years hence and bearing half-yearly coupons at 5%."
"had the bond borne coupons at 4½%."
"had the coupons been for $225. each ..... the coupons being only for $200. each."

One great difficulty with which conscientious school teachers have to contend is the disposition on the part of arithmetic pupils to ignore entirely the philosophical aspects of the various problems given them—working solely to get the answer, and, when that is accomplished, dismissing the matter from their minds as a closed incident. On account of the numerous coincidences that may and do arise in mathematics, it is quite probable that many a correct answer has been obtained by a dangerously incorrect process. As an example, a scholar called upon to find the area of a circle tries the experiment of multiplying the diameter into 3.14159 and taking half of the product. If the given diameter happens to be 2, the correct result that he obtains is no index to his understanding of that phase of mensuration.

This state of affairs is not confined entirely to school children—it is found occasionally among grown-ups. For instance, every single one of the thousands of semi-annual bond values published by one author are perfectly correct numerically, and yet the method by which they were calculated, as well as the philosophical interpretation and application, is as wrong as anything can be. Furthermore, that author's really (numerically) accurate values are, by his own admission, inaccurate, or at least in violation of what he considered correct principles, and were put out for commercial purposes to supply a popular demand which he honestly, even if erroneously, believed was founded upon error, which he appeared to be unable to stamp out. To be specific: if called upon to furnish a value for $1,000. twelve year 4s to yield 10% he would have

given the correct figures of $586.04, but his interpretation and application would have been substantially as follows:

In order to fulfill the conditions it is necessary:

(a) That you obtain $29.30 in actual cash every 6 months available for spending purposes.

(b) That your net capital 12 years hence when the bond matures be the same as at present, viz, $586.04.

Six months hence, at which time you are entitled to $29.30 in cash, you will obtain $20. from the coupon you collect. The remaining $9.30 you must borrow somewhere for 11½ years at 10% interest, compounded semi-annually. Twelve months hence you must borrow another $9.30 at the same rate for 11 years, etc. When the bond matures you will find that your total indebtedness on the 23 loans is $384.66, and after paying that, as well as paying yourself the last $29.30, you will have left your original capital of $586.04.

An hour later perhaps there might be another call for a value for some 40-year 1s to yield 2%, and the problem would be handled in a similar manner except that the figures given would contemplate that all this future borrowing would be done at the rate of 2%.

It is to the credit of the reinvestmentists, however, that they were logical enough to see the absurdity into which they were thus led, and took the ground that tables intended for general use, in order to possess any utility, must provide for borrowing or reinvesting at some sane average rate. In fact, two authors have gone so far as to bring out a comprehensive set of tables of this character—both adopting the rate of 4%. For 12-year 4s to yield 10%, 63.799 is given, instead of the correct value of 58.604 as shown above.

All this is of course as absurd as it can be, being one result of the fallacy that there is no interest and that there can be no interest unless and until a cash payment in actual bills or coin takes place; in short, it is going the limit in refusing to acknowledge the efficacy or even the existence of accountancy, and possesses but one merit, to wit, it assumes that the investment is the sum of money which the investor pays for the bond.

Returning to the subject of obtaining correct results by incorrect, or at least philosophically unsound, methods, let us assume

that a corporation offers for sale an issue of $100,000 7s, to be dated May 1, 1920, due May 1, 1925, and finally accepts the best bid received, viz, a 7% basis. If delivery is made on May 1st the buyer pays $100,000 for his purchase, which is correct. But he, as well as many other people, are firmly of the opinion that he bought the bonds at par or their face value with no interest accrued, which is not correct. A closer scrutiny of what he bought reveals that it consisted of eleven different notes or bonds maturing serially from ½ to 5 years, with a total face value of $135,000 and an average life of 4.42 years. As all these notes (with one exception) have the same par value and (with one exception again) have different lengths of time to run, and yet are to yield the purchaser a uniform rate of interest, it is obvious that each one must have a different present worth, and the proper price for each note is found by a trustworthy true discount table to be:

| Note | Years until due | Par value | Present worth | Discount |
|---|---|---|---|---|
| 1 | ½ | $ 3,500 | $ 3,381.64 | $ 118.36 |
| 2 | 1 | 3,500 | 3,267.29 | 232.71 |
| 3 | 1½ | 3,500 | 3,156.80 | 343.20 |
| 4 | 2 | 3,500 | 3,050.05 | 449.95 |
| 5 | 2½ | 3,500 | 2,946.91 | 553.09 |
| 6 | 3 | 3,500 | 2,847.25 | 652.75 |
| 7 | 3½ | 3,500 | 2,750.97 | 749.03 |
| 8 | 4 | 3,500 | 2,657.94 | 842.06 |
| 9 | 4½ | 3,500 | 2,568.06 | 931.94 |
| 10 | 5 | 3,500 | 2,481.22 | 1,018.78 |
| 11 | 5 | 100,000 | 70,891.88 | 29,108.12 |
| | | $135,000 | $100,000.01 | $34,999.99 |

The answer, $100,000, is the same in either case, but there is considerable (and decidedly important) philosophical distinction between the popular myth that one bond for $100,000, bearing interest at the rate of 7%, was bought at par and the actual fact that eleven bonds, aggregating $135,000, that do not, or at least need not so much as mention the word interest, were bought at an average discount of 25.93%.

Suppose that the company did not obtain an offer for the bonds until June 1st, when they were sold on the same terms, viz, a 7% basis. The company would demand, and no doubt obtain:

| | |
|---|---|
| Par | $100,000.00 |
| One month's accrued interest at 7% | 583.33 |
| | $100,583.33 |

The purchaser might object to the $583.33 on the grounds that it was obtained by monthly instead of semi-annual compounding. His claim, being manifestly just, is allowed, and the figures are amended to read $100,575.00, which are as incorrect as they can be except numerically. Five hundred and seventy-five dollars interest! How can there be any interest when nothing has as yet been borrowed or lent? During the last 30 days no change whatever has taken place in what is being bought and sold. It still consists of 11 notes aggregating $135.000 maturing $3,500. November 1, 1920; $3,500. May 1, 1921, etc., and the rate of interest to be earned is still 7% semi-annually. It is in the calendar that the change has occurred. The first note will mature and be paid in 5 months, the second in 11 months, etc.; hence the present worth of each is now greater, and by proper calculation is found to be:

| Present worth | Discount |
|---|---|
| $ 3,401.08 | $ 98.92 |
| 3,286.08 | 213.92 |
| 3,174.95 | 325.05 |
| 3,067.59 | 432.41 |
| 2,963.85 | 536.15 |
| 2,863.62 | 636.38 |
| 2,766.79 | 733.21 |
| 2,673.22 | 826.78 |
| 2,582.83 | 917.17 |
| 2,495.49 | 1,004.51 |
| 71,299.51 | 28,700.49 |
| $100,575.01 | $34,424.99 |

Now that an investment has been made and an indebtedness incurred, matters are changed, and interest begins to accrue in earnest at the rate per $100,000. of $19.11 daily, $191.30 every 10 days, $287.09 every 15 days, etc. It is, however, accruing, not on the bonds, as is generally supposed, but on the $100,575.00 which the company borrowed and the investor lent. Assuming, for instance, that both parties see fit to make entries in interest account at monthly intervals, then their correctly kept books will show the

following amounts respectively owing to/owed by this loan investment:

| | |
|---|---|
| July 1..... | $101,153.31 |
| August 1..... | 101,734.95 |
| September 1..... | 102,319.93 |
| October 1..... | 102,908.27 |
| November 1..... | 103,500.00 |

After the coupon is paid the balance is pulled down to $100,000, and during each ensuing six months throughout the life of the loan the balance will work up to $103,500. and then fall to $100,000. in exactly the same manner; but it is somewhat rash to assert or take for granted that one of the notes, as it matures, is interest on the original investment simply because it happens to be for the same sum of money that represents interest earned up to that time.

This will work very well so long as all the coupons are for the same amount, mature at regular intervals, and date from and finally mature with the bonds themselves, which is of course true in an overwhelming majority of cases, and yet does not need to be ever the case—at least as far as providing suitable and satisfactory loan investment at some fixed interest rate is concerned.

In 1878 a small issue of bonds was put out by the Brunswick & Chillicothe R. R. Co. (a part of the Wabash system) with coupons as follows: 2% for 6 years; 3% for 19 years and 4% for the remaining 3 years, which must have proven hard sledding for the par-worshippers of those days, to whom was yet unrevealed even the contemptible lazy-man's makeshift known as the pro-rata method and who, as far as I know, had nothing to turn to for help except a small pioneer edition of 4-place bond values designated by its author as "stock tables."

The normal logical starting point when the security is supposedly unquestioned is 0% basis. In a case of $1,000. 20-year 6s for instance this would be $2,200., which is the true par. If bought at this price there is no preponderance of the amount repaid over the amount invested; the ratio of increase for any epoch is 1.00; the interest $0.00 and time immaterial. If, however, the bond be bought for $2,199.99, interest amounting in the aggregate to 1 cent will be earned in the 20 years, and (at the expense of considerable labor) the average semi-annual rate may be ascertained

with the utmost precision; and, provided fractions of cents are duly accounted for, the investment can be carried along and made to stand at $1,000. at maturity in exactly the same manner and with the same accuracy as if the bond had been bought to yield say 5%. As the amount paid for the investment decreases the effective rate of interest increases and finally becomes infinitely large when the bond is bought for $0.00. Taking 1 cent as the minimum variation that may be made in a sum of money, it follows that there are 220,000 different income bases ranging from 0% to infinity% upon which this $1,000. bond may be purchased. For $10,000 worth there are 2,200,000; for $100,000 worth there are 22,000,000, etc. As might be expected from our familiarity with the laws of chance, it happens that a single one of these thousands or millions of income bases possesses special unique properties, just as .31622777 + is the reciprocal of 3.1622777 + or .137128857 is the log. of 1.37128857, but to seize on this "punctual interest basis" as an ideal standard and consider everything else between zero and infinity as distortions thereof through the operations of premiums and discounts, instead of regarding it as a special incidental case characterized by interesting and extraordinary properties, is in my opinion quite as bad as it would be for astronomers to consider the orbits of all the planets as circles of varying degrees of distortedness.

The professional accountants of the country should look upon the subject of investment accountancy with a somewhat broader vision than a pawnbroker or a drudging discount clerk in a commercial bank; awaken to a realization of the fact that something besides a pair of shears and a ticker is required to collect and distribute the income from the bonds owned by a trust estate or insurance company, or ascertain the interest charges, outstanding indebtedness and surplus of a modern corporation; learn that the effulgent halo that is supposed to encircle the sacred brow of par is no more existent than the pink elephants and green-tailed monkeys seen by inmates of inebriate wards—in short, not allow themselves to be influenced and guided entirely in their professional conduct by the customs, traditions and precepts of a Broad street curb specialist or some politician at Augusta or Lansing.

# The Journal of Accountancy

Published monthly for the American Institute of Accountants by
The Ronald Press Company, 20 Vesey Street, New York, N. Y.
Thomas Conyngton, president; L. G. Henderson, secretary;
Hugh R. Conyngton, treasurer

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## EDITORIAL

### Misuse of Accountants' Reports

There has been much comment because prospectuses and other literature issued prior to the flotation of securities have so frequently failed to indicate whether or not the affairs of the companies concerned have been subjected to independent investigation. In other cases when audits have been made there have been only incomplete and often misleading summaries of the accountants' figures and findings.

In the interest of all concerned it should be a fixed rule that securities in which the public is asked to invest should be supported by statements showing the results of impartial examination conducted by reputable practitioners.

The ideal condition would be the publication of the accountant's complete certificate, but in no case should there be any condensation which eliminates essential facts.

Often in these days one reads that John Doe, president of the company, supplies the following information. Of course, presumably, John Doe is an honest and honorable man, but as an interested party he cannot be completely impartial. The element of self-interest therefore will incline him to magnify the merits of the proposition and to deal gently with its demerits.

Frankly, we imagine that many investors must hesitate a long while when they find that an offering is compelled to rely upon the ex parte assertions of company officers. In particular an industrial concern which does not present an impartial reflection of its financial condition should never receive the encouragement of public subscription to securities.

Stock exchanges could do much, if they would, to bring about a needed reform following the lines of the English companies' act or similar legislation in force in Canada and other British possessions.

It is not sufficient, however, that there be an independent audit, unless the public is sure that the accountant's findings are truthfully conveyed to possible investors. It is really worse than no report at all if vital figures are omitted or qualifications in the certificate are suppressed.

Incidentally a duty rests upon accountants to require clients and their bankers to make a fair use of their reports or certificates. Unless they do this they are morally responsible to the public for any misrepresentation in regard to which they do not exhaust every corrective remedy.

As an illustration of the use of an accountant's name in a way that might mislead the public, it is instructive to consider a recent prospectus, one paragraph of which reads somewhat as follows:

"Our accountants are John Smith & Son of Boston, who have audited our books for the last two years. All statements given, except for the year 1919, of which an audit is about to be made, are supplied by public accountants of high standing employed by us prior to our association with John Smith & Son."

In other words, the company leads the public to believe that its affairs have been audited by John Smith & Son, and that a clean bill of health has been given. As a matter of fact, the paragraph quoted means absolutely nothing except that John Smith & Son have conducted an audit—and it is quite possible that the accounting firm found it necessary to damn the whole financial condition of the company. There is no copy of the certificate, and the figures which are given are apparently in no wise connected with the accountants' investigation.

An unthinking prospective investor glancing over the prospectus to which we refer might be forgiven if he came to the conclusion that the financial affairs of the company had been investigated and their soundness endorsed by the well-known and reputable firm of John Smith & Son.

This is a misuse of the accounting profession against which the entire membership should vehemently protest.

## Federal Registration of Accountants

Three or four years ago Edward N. Hurley, then chairman of the federal trade commission, propounded a scheme for the registration of accountants throughout the country under a federal regulation.

The idea met with considerable favor, particularly among government departments, and some members of the accounting profession who gave the matter only a superficial consideration expressed the thought that the plan had merit.

The American Institute of Accountants, through its committee on federal legislation, made emphatic protest against anything in the nature of federal regulation and succeeded in convincing the sponsors of the movement that it would be entirely undesirable.

Quite lately, however, there has been a recrudescence of the registration idea. There have been so many so-called tax experts and violations of the canons of decency that we fear there may be honest souls who may be convinced that something in the nature of federal regulation is imperative. Consequently, it may not be out of place to point out some of the essential fallacies of the idea.

If there were federal registration or regulation in any other form it might not be undesirable, provided the selection of the men and women to be registered were entirely detached from politics. For example, if the selection of qualified practitioners were to rest with the American Institute of Accountants and C. P. A. boards of states in which C. P. A. legislation is properly administered, no great harm might accrue.

Can anyone acquainted with official Washington imagine a bureau entrusted with the registration of accountants becoming anything more than a meeting place for congressmen and other politicians whose constituents desired registration? Anyone familiar with the way in which postmasterships are handed out may form a slight but inadequate idea of the political pressure which would bear upon the registrar of accountants. Every congressman from the back woods and the plains would have a constantly increasing number of friends "back home" seeking the prestige of federal registration. Probably many men who had never even been bookkeepers would shortly be registered as federal accountants, and it might easily follow that states in which there

was practically no accounting work to be done would boast a register of accountants coextensive with the census.

It is all very well to say that registration could be carried out without consideration of the requests of congressmen and others, but no one who is familiar with official facts would believe such a statement.

The accounting profession is quite capable of managing its own affairs free from the dictates of politicians. The American Institute of Accountants was formed chiefly because the issuance of certified public accountant certificates had come so largely under the control of political powers. Anything in the nature of federal regulation would be reverting not only to conditions which preceded the formation of the institute, but to something infinitely worse.

What seems to us a far more desirable plan would be federal registration of incompetent accountants. If the government would make note of slip-shod, inefficient and fraudulent work done by persons posing as accountants or tax advisors and would take some means to protect the public against charlatans, it would be accomplishing something. Congressmen would not be so anxious to seek registration of their friends on such a list.

# Income-Tax Department

As was confidently expected by every accountant, an extension of time for filing final returns of corporations was granted by the commissioner of internal revenue before the expiration of the statutory limit on March 15th.

The unfortunate feature of the case was, however, that no one could be absolutely sure that an extension would be granted, and accordingly accountants worked under a degree of pressure which was almost unbearable. There seems to be no valid reason why inevitable extensions cannot be announced in time to afford some relief to accountants and others who are doing their utmost to prepare returns, on the basis of which the government is to derive its principal income.

The extension was in the form of an authorization to collectors of internal revenue to accept tentative returns from corporations on or before March 15th, to be followed by final returns not later than May 15th.

The permission was granted under date of March 4th in the form of It. Mim. 2420.

Extension until May 15, 1920, of the final date for filing corporation returns, form 1120, for the calendar year 1919

To collectors of internal revenue:

In view of the fact that considerable difficulty is being experienced by corporations and their representatives in the preparation of income-tax returns for the year 1919, collectors of internal revenue are hereby authorized to accept tentative corporation returns for the calendar year 1919 on or before March 15, 1920. Each return must be accompanied by at least one-fourth of the estimated amount of tax due, together with a statement setting forth the reason why the return cannot be completed within the prescribed time, and a formal request for the extension. Any deficiency in the first instalment will bear interest at the rate of six per cent per annum.

An extension of time is hereby granted to corporations in such cases to file completed returns on or before May 15, 1920. The tentative return submitted in accordance with the foregoing should be on form 1120, on which should be written plainly across the face "tentative return." Only the estimated amount of tax due need be stated.

Tentative returns filed under this authority will be handled in collectors' offices in the manner prescribed for the handling of similar returns last year.

A further extension of time within which to file returns will not be granted except in extraordinary cases and upon proper application to the commissioner of internal revenue, setting forth the reasons why the return cannot be completed.

It. Mim. 2383 is modified accordingly.

Since the March issue of THE JOURNAL OF ACCOUNTANCY was published there have been only three treasury rulings relative to income tax, one dealing with estates and trusts which cannot be treated as units, one with returns from non-resident alien beneficiaries, and one with compensation received in something other than money.

## TREASURY RULINGS

(T. D. 2987, March 1, 1920)

*Income Tax*

Adding article 347 to regulations No. 45, dealing with estates and trusts which cannot be treated as a unit

Regulations No. 45 are amended by adding thereto article 347 to read as follows:

ART. 347. *Estates and trusts which cannot be treated as a unit.*—In the case of certain estates and trusts it is recognized that the estate or trust cannot be treated as a unit for income-tax purposes, and may represent an aggregate of distinct interests to all of which the fiduciaries are responsible. In such cases the procedure stated in this article should govern. The following are recognized as cases which cannot be treated as a unit, and must, therefore, be governed by this article: (*a*) When there is income distributable periodically and also income which is to be accumulated in trust, held for future distribution, or added to the corpus; (*b*) when there is income distributable periodically and also income (according to the federal income-tax statutes and regulations) which is not distributable periodically under State law, e. g., gains from sale of capital assets, stock dividends; (*c*) when there is income distributable periodically and deductions (according to federal income-tax statutes and regulations) which are not deductible under state law from the distributable income, e. g., losses from the sale of capital assets, depletion, depreciation.

In ascertaining whether an estate or trust comes within any one of the cases just enumerated, the provisions of the federal statutes and regulations —rather than the provisions of the will or trust and the provisions of state laws—shall determine what items constitute taxable gross income or allowable deductions; the provisions of the will or trust and of state laws shall determine the allocation of items of gross income or deduction; that is, to which of the different interests making up the whole such items shall be charged or allowed. In cases which are to be treated under this article, the items of gross income and deduction as determined by the federal income-tax statutes and regulations must be scrutinized and classified in accordance with the provisions of the will or trust or rules of local law into two classes, one subject to the procedure specified in subdivision (*c*) of section 219, and the other to the procedure specified in subdivision (*d*) of section 219. The result will be that the beneficiary to whom income is to be distributed periodically must include in computing his net income the amount actually distributable to him (except exempt income), even though the aggregate of the distributive shares should be larger than the net income of the estate or trust computed as a unit. Any gain, profit or income which is not periodically distributable must be included in computing the net income of the estate or trust so that the fiduciary will pay the tax upon any excess of the net income of the estate or trust computed as a unit over the aggregate distributive shares.

For example, a trust is created, the income of which is distributable periodically for the life of the beneficiary, the remainder over to others. The trust has the following items of income: rent, $3,000; interest, $2,000; gain on sale of capital assets, $1,500; cash dividend, $1,000. And deductions: general expenses (all deductible from distributable income), $700; depreciation, $300; loss on sale of capital assets, $3,000. Under the terms of the trust $5,300 will be distributed to the beneficiary, viz., rent, $3,000; plus interest, $2,000; plus dividend, $1,000; less general expenses, $700. The gain and loss on the sale of capital assets will be considered capital items affecting the corpus only, and the items of depreciation will not affect the amount to be distributed, there being no rule of State law or provision of the trust re-

quiring this deduction from distributable income. In such a case the fiduciary must report on form 1041, showing a net income for the trust of $3,500, and must show as the distributive share of the beneficiary the $5,300 to which he is entitled. The beneficiary must account for the amount actually distributable to him as income, viz., $5,300, as provided in section 219 (*d*), and will be entitled to a credit of $1,000 on account of the dividends in computing the normal tax, but not to any deduction on account of depreciation or capital losses.

If there had been no loss on the sale of capital assets so that the net income of the estate or trust was $6,500, form 1041 should show the distributive share of the beneficiary as $5,300 and the distributive share of the fiduciary as $1,200; and the fiduciary should file a separate return on form 1040 A, reporting $1,200 for taxation.

(T. D. 2988, March 3, 1920)

*Income tax—Assessment and administration*

Amending article 29, paragraph 200, regulations No. 33 revised

Paragraph 200, of article 29, regulations No. 33 revised, is hereby amended to read as follows:

*Nonresident alien beneficiary.*—Where a fiduciary in the United States is the recipient of trust income for which there is but one beneficiary, and that beneficiary a nonresident alien, the fiduciary will be required to make full and complete return on income-tax form 1040 or 1040A, as the case may be, for this trust income on behalf of the nonresident alien, and pay any and all normal tax found by such return to be due, and any and all surtax, provided the income is not rturned for the purpose of the tax by the beneficiary. Where there are two or more beneficiaries, one or all of whom are nonresident aliens, the fiduciary shall render a return on form 1041, and a personal return on form 1040 or 1040A, for each nonresident alien beneficiary.

(T. D. 2992, March 29, 1920)

*Income tax*

Gross income defined—inclusions—article 33, regulations No. 45, amended

Article 33 of regulations No. 45 is hereby amended to read as follows:

ART. 33. *Compensation paid other than in cash.*—Where services are paid for with something other than money, the fair market value of the thing taken in payment is the amount to be included as income. If the services were rendered at a stipulated price, in the absence of evidence to the contrary, such price will be presumed to be the fair value of the compensation received. Compensation paid an employee of a corporation in its stock is to be treated as if the corporation sold the stock for its market value and paid the employee in cash. When living quarters, such as camps, are furnished to employees for the convenience of the employer, the ratable value need not be added to the cash compensation of the employee, but where a person receives as compensation for services rendered a salary and in addition thereto living quarters, the value to such person of the quarters furnished constitutes income subject to tax. Premiums paid by an employer on policies of group life insurance covering the lives of employees, the beneficiaries of which are designated by the employees, are not income to such employees.

# Students' Department

EDITED BY SEYMOUR WALTON

(ASSISTED BY H. A. FINNEY)

## CHARGE AND DISCHARGE

*Editor, Students' Department:*

SIR: Will you kindly settle the following question for me:

Can the phrase "charge and discharge" be used in referring to book entries in a synonymous sense to debit and credit?

In making up some statements to be journalized I used the word charge in place of debit and discharge in that of credit. Another one of the office force ridiculed me for this, saying that neither bookkeeping nor accounting, either literally or theoretically, admits the use of "charge and discharge" in place of debit and credit. As I do not know, I cannot argue with him. I will appreciate it greatly if you will render an opinion as to whether I am right or not.

Yours truly,
G. Q. D'A.

As far as we know the terms charge and discharge are used only in the statements of executors and others handling trust funds. The executor charges himself with an asset when he assumes responsibility for it, and he discharges himself when he parts with the asset and thus relinquishes responsibility.

It will be noted that the executor charges and discharges himself, not the asset. The only way in which these terms would be applicable to a bookkeeper of commercial accounts would be for him to consider himself the trustee of the business, responsible at least for their correctness. He could then say that he charged himself with all the debits and discharged himself when they were disposed of. But if he called all credits discharges, he would be in a bad fix when it came to an item which originated as a credit. When he entered a note payable, he would be discharging himself from a responsibility that he never had.

The terms debit and credit fill all the requirements, and it seems foolish to substitute for them terms that are very far from being improvements, to say the least.

## CAPITAL STOCK TEMPORARILY IN ABEYANCE

*Editor, Students' Department:*

SIR: I enclose herewith a copy of a trial balance, and would appreciate if you can give me some information relative to one or two items about which there has been discussion.

This company was incorporated with a capital of $500,000.00, and $272,190.00 is held in escrow by the commission in this state, until the company pays a dividend of 6% on the balance of its stock. Of the escrow stock $125,000.00 would be given to the patentee and inventor, and $147,190.00 is held in trust for the old stockholders. How would you treat these entries on the balance-sheet? I have just submitted a balance-sheet, leaving off

the escrow stock, as I consider it of no value until the company pays a dividend, as arranged when it was organized.

CONDENSED TRIAL BALANCE

December 31, 1919

| | | |
|---|---|---|
| Cash | $68,403.52 | |
| Liberty bonds and war savings stamps | 4,272.23 | |
| Bills receivable | 300.00 | |
| Sundry employees | 80.45 | |
| Factory lease | 100.00 | |
| Rough castings and raw material | 10,386.24 | |
| Finished parts | 17,162.65 | |
| Stationery, electros, etc | 1,068.77 | |
| Fuel | 365.70 | |
| Machinery and equipment | 7,089.73 | |
| Office furniture | 923.85 | |
| Prepaid insurance | 819.90 | |
| General expense | 63,685.27 | |
| Experimental and development | 11,311.19 | |
| Subscriptions to capital stock | 44,996.39 | |
| Unissued capital | 10,960.00 | |
| N. Smith, personal stock | 125,000.00 | |
| N. Smith, stock in trust | 147,190.00 | |
| Accounts payable | ..... | 13,717.47 |
| Discount and interest | ..... | 392.42 |
| Capital stock authorized | ..... | 500,000.00 |
| (Debits really add $514,115.89) | $514,109.89 | $514,109.89 |

Trusting you can give me this information, I am

Yours truly,

Detroit, Michigan. J. H.

There is no reason why any stock should be left off the balance-sheet because it happens to be held in escrow, but this condition should be recognized in any financial statement.

The proper way to exhibit the stock on the balance-sheet is as follows:

| | | | |
|---|---|---|---|
| Capital stock, authorized | $500,000.00 | | |
| Less unissued | 10,960.00 | | |
| In escrow for patents | 125,000.00 | | |
| In trust for old stockholders | 147,190.00 | $283,150.00 | |
| Total subscribed | | $216,850.00 | |
| Less subscriptions unpaid | | 44,996.39 | |
| Net stock paid in | | | $171,853.61 |

This shows the entire situation exactly as it is. If no mention is made of the $272,190.00 of escrow stock, it might be inferred that no such stock existed and that the directors have that much unscribed stock that they could sell for cash. The real situation is far from being as favorable as that.

Incidentally we note that the debit side of the trial balance adds up $6.00 more than the total given. When figures are copied they should always be added to prove. Ordinary proof-reading is not enough.

### Writing Up Land Value

*Editor, Students' Department:*

Sir: I would like to ask your assistance in regard to the real estate account on the books of our company, the details of which are as follows:

At the time of incorporation in 1880 the land was only considered good for grazing and valued at something like $5.00 an acre, and there were somewhere around 100,000 acres taken in at the figure of $5.00 an acre and stock was issued. Since this land has proven a rich farming land and has advanced in price to $150.00 an acre at the present time, the company has sold enough of the land at the price of $150.00 an acre for the real estate account to show a credit of $50,000.00. The entire amount of the sale has been credited to real estate and no part carried to profit and loss. The old records are such that it is almost impossible to ascertain exact cost of this land per acre, as there have been some drainage ditches put in and enclosed in a wire fence and cross fenced. There would not be any difficulty in establishing the fair market value on March 1, 1913, at $100.00 an acre.

Would you advise setting up on the books the fair market value of March 1, 1913, and crediting surplus or setting up a charge to real estate and credit of profit and loss to offset this credit balance?

What effect will this have on the income and war profits tax?

Yours truly,
C. J. M.

It is generally considered that it is wrong to write up the value of an asset solely on account of an increase in its market price.

A. Lowes Dickinson modifies this idea, and takes the ground that "over a period of years changes in values may be sufficiently permanent to render it unfair to one business to maintain original cost values as compared with another whose assets have been created at widely varying costs." He is in favor of allowing a reasonable increase in value where there is every reason to believe that it is permanent, especially where sales of part of the assets have fixed the price of the whole lot.

In the case in point justification for the write-up may be found in the fact that the supposed character of the land has changed. It was bought as grazing land and has since turned out to be rich farming land. The increase in value does not arise solely from a better demand for grazing land, but is caused by the discovery that it is intrinsically more valuable.

In writing up the value, the offsetting credit should be to surplus direct, as it is not the profit of any one year.

As to the income tax, the difference between the selling price and the value at March 1, 1913, is taxable income of the year when the sale was made.

### Padding Invested Capital

*Editor, Students' Department:*

Sir: I do not know whether subscribers are privileged to ask you for solutions to accounting questions which they run up against or not, but I am taking a chance, and would surely appreciate an opinion on the following:

A corporation was organized in 1900. The plants, equipment, materials, patterns, patent rights, etc., of several concerns were taken over. All the capital stock was issued for these items. Capital accounts were set up and the total of them agreed with capital stock account. Very little was charged off for depreciation in the early years, but in 1907 an appraisal company

made an inventory of the plant and equipment and the accounts were adjusted accordingly.

In 1919 public accountants were called in for the purpose of examining the books with a view to making up the income-tax return. They started in at 1907 and added to the capital accounts items which had been charged to expense accounts in error and corrected the accounts up to March 1, 1913. Now (here is the part that bothers me) they add to the capital account 20% of the total administration expenses—these include officers' salaries, office expenses (except selling), interest, taxes, insurance, etc.—from the start of the company (1900) through March 1, 1913. The accountants' explanation is that a certain proportion of the administration expense applies to capital items, inasmuch as part of the officers and engineers' time is taken up in planning improvements, etc. In the above case the 20% of the administration expense almost equaled the total amount of additions made to capital account from the start of the company to March 1, 1913. It is the writer's opinion that if any time should be added for overhead, as the above might be called, it should be a certain percentage of the value of the addition, or, in other words, a percentage such as that on which an architect's fee is based. Reserves for depreciation were set up from 1907 onward, and, of course, the addition of the 20% administration allowed a bigger depreciation charge for the taxable year. I don't know whether the above idea will pass revenue muster or not, but what I'm concerned to know is: is it good accounting procedure? I might add that the accountants deemed it unwise to continue the policy after March 1, 1913.

Yours truly,
A. R. C.

No one can give an authoritative answer about a subject of which he does not know all the details. From what facts are given in the letter it would look very much as if the accountants were taking extreme measures to increase the invested capital with a view to the effect on the excess profits taxes.

If very extensive additions and improvements are being carried out, and a certain amount of time is actually given to the work by officers and clerks of the concern, it is usually considered legitimate to charge a fair proportion of their salaries as a capital expenditure; but the federal reserve bulletin on *Approved Methods for the Preparation of Balance-sheet Statements* advises against capitalizing such expenditures. It hardly seems possible that this proportion should be as high as 20% for nearly or quite twelve years. Still less is it probable that the same proportion would hold for office expenses, interest, taxes, insurance, etc.

However, we would not say that it was impossible. The company may have been doing an abnormal amount of developing and comparatively little production during its first twelve years. It would require a review of all the conditions to enable one to form an opinion that would be of any value. Without that, all that can be said is that it looks suspicious.

### Commission on Sale of Capital Stock

*Editor, Students' Department:*

Sir: The writer would like you to explain the following queries:

A new gas company is selling stock for $100 a share, this being its par value. The salesman gets a commission of 5% for his sales. How would you make the proper entries? Another salesman wants stock instead of

commission at the same rate as above. What entries would you make for this?

In a case where stock is sold on the instalment plan how would you treat the expense of collecting the instalments? How would you treat forfeited instalment subscriptions when the firm is permitted to retain payments already made?

Trusting to be favored with a prompt reply in regard to the above requests, I wish to remain

Yours truly,
S. J. V.

The entry to be made for the sale of stock depends on the entries that have gone before. If no capital stock entries had been made, these would be in order:

| | | |
|---|---|---|
| Subscriber ..... | xx | |
| Capital stock ..... | | xx |
| For ——— shares of stock. | | |
| Commissions ..... | xx | |
| To salesman ..... | | xx |
| Paid John Doe on ——— shares at $5.00. | | |

Of course, cash paid by subscribers or to salesmen would go through the cashbook.

A salesman buying stock would be treated like any other subscriber, except that the payment of his subscription would be shown by a charge to his account instead of by an entry in the cashbook. However, he might be given a cheque for his commissions, and then he could pay for his stock in cash.

Specific expenses collecting instalments may be charged to organization expense, with legal and other expenses incident to starting the concern.

If instalments are forfeited the entry would be:

| | | |
|---|---|---|
| Capital stock (or unsubscribed stock)..... | $1,000.00 | |
| Subscriber ..... | ..... | $900.00 |
| Forfeited stock ..... | ..... | 100.00 |
| For stock forfeited by ———. | | |

Eventually commissions would be charged to organization expense, and forfeited stock should be credited to the same account. This account should be written off in as few years as possible, out of profits.

### Profit on Returned Purchases

*Editor, Students' Department:*

Sir: I note that you answer accounting problems, and as a little controversy has arisen in our store between the accounting and sales departments, I am writing you for an authoritative opinion. We closed out an important line of merchandise, and the manufacturers thereof agreed to take it back at the prevailing cost price, which in some cases is higher than what was actually paid for it. The amount involved is about $2,500.00, and the question is if this should be credited to purchase account or sales.

Yours truly,
F. J. M.

We do not see that a slight difference in price alters the status of goods returned to the purchaser. The sales department did not sell them, and they certainly do not belong in the category of sales. There seems to be no disposition that can be made of them except to treat them like any other returned purchases—credit them to purchase account, at cost, and credit the excess over cost to profit on returned goods.

### Fire Losses

*Editor, Students' Department:*

Sir: In case of fire losses, when the property involved is carried in the investment or property account at its original cost, but is insured for its replacement value and the amount of insurance recovered exceeds the charge to investment, how should this excess be shown in the accounts?

If it was customary to charge off the net loss through an expense account, would it be good practice to credit the same account in case the recovery exceeded the original cost?

J. A. D.

The fact that errors have been made in the past by charging fire losses to an expense account does not justify the credit to expense of an unexpected profit from a fire. All adjustments of fire losses must be made through the surplus account, since they are not part of the normal operations of the business, but are accidental and extraneous.

If fire losses are so frequent as to be considered more or less a normal expense, provision against them should be made by an additional annual charge to insurance and a credit to reserve against fires. All settlements then would be through the reserve account. In this way losses will be equalized, instead of being heavy charges some years and very light or none in other years.

### Controlling Account for Freight on Delivered Goods

*Editor, Students' Department:*

Sir: I would be pleased to have some information as to how I can control the freight account as accounts receivable and payable are controlled. I am able to control and identify all of my accounts with this exception.

Our method is to estimate the freight and place it in an estimated freight column of ledger sheet, posting direct from copy of invoice. Then when the expense bill is sent in by customer the exact freight is placed in an amount freight returned column. We have a freight dr. & cr. account in cash journal. We have no car book, and I am at a loss as to how I can control this freight without a car book. For instance, my freight account shows a credit of about $20,000.00 representing freight that we owe to our customers, awaiting the return of their expense bills for freight credit, and is an account payable, in one sense of the word. I have never been able to take a trial balance and show to within a thousand or more dollars to whom this is due—in other words, to identify the freight with the customer's name and have it come anywhere near a balance.

I will appreciate any information that you can give me or any advice as to where I can get a book which would deal with freight handling. I have quite a little accounting library but have nothing that gives me the information I need in this case.

Yours truly,
M. J. E.

It is necessary to assume some conditions that the letter does not specify. It is presumed that goods are sold f. o. b. destination, and that the freight is not prepaid but is paid by the customer, who returns the freight voucher for which he receives credit to apply as part payment for the goods. If that is the situation the freight is a charge against sales, when finally determined, and a credit to the customer.

If it were possible to prepay the freight there would be nothing to do except to charge delivered freight. Since it is not possible, it becomes necessary to institute clearing accounts in order to record the liability for the freight. First, this entry should be made:

| | | |
|---|---|---|
| Estimated freight ..... | $100.00 | |
| Reserve for freight ..... | ..... | $100.00 |
| To cover freight on invoice 5612. | | |

When freight bill is received from customer, this entry:

| | | |
|---|---|---|
| Prepaid freight ..... | $95.00 | |
| Reserve for freight ..... | 5.00 | |
| Estimated freight ..... | ..... | $100.00 |

Then:

| | | |
|---|---|---|
| Reserve for freight ..... | $95.00 | |
| Customer ..... | ..... | 95.00 |

This finally lands the actual freight in prepaid freight and the customer account and ends this transaction.

The controlling account may be kept in a register of prepaid freight ruled in columns thus:

PREPAID FREIGHT REGISTER

| | | | | | *Disposition* | |
|---|---|---|---|---|---|---|
| Date | Invoice No. | Name | Estimate | Prepaid Freight | Reserve | Date |

The undisposed-of amounts must be equal to the balance of estimated freight and also of reserve for freight on the general ledger, which are the controlling accounts, while the register is the subsidiary record. These should be balanced at least once a month.

Of course, the journal entries can be kept in columns and only the totals posted to the controlling accounts monthly.

The management will have to decide what to do with the old accounts that are out of balance. The new accounts can be started at once and should be kept in balance.

## Valuations by Appraisal Company

*Editor, Students' Department:*

Sir: The writer is confronted by a problem in accounting as stated below:

A corporation carries on its books capital asset accounts of land, buildings, machinery and fixtures, office furniture and fixtures and small tools.

The properties represented by these accounts have been appraised by an appraisal company as of December 31, 1919, and the values as shown by this

appraisal considerably exceed the values as shown by the book accounts. How should these excess amounts be written on the books of the corporation so that the books will at all times disclose the correct cost value of the property and the appraised value as of above-mentioned date?

The writer has worked out his own solution of the problem and presents it herewith:

*Debit*

Appraisal adjustment as of December 31, 1919

| | |
|---|---|
| Land | ..... |
| Buildings | ..... |
| Machinery and fixtures | ..... |
| Office furniture and fixtures | ..... |
| Small tools | ..... |
| Total | ..... |

*Credit*

Appraisal adjustment surplus

| | |
|---|---|
| Land | ..... |
| Buildings | ..... |
| Machinery and fixtures | ..... |
| Office furniture and fixtures | ..... |
| Small tools | ..... |
| **Total** | ..... |

Will you kindly advise me whether in your opinion this solution is correct and greatly oblige

Yours truly,
T. H. L.

Chicago.

The procedure to be followed when an appraisal company values fixed assets at higher figures than the net carrying value depends on conditions not disclosed in the letter,

It may be that too much depreciation has been charged off in the past. If that is the case, the adjusting entry should be a debit to reserve for depreciation and a credit to surplus. This is because surplus has been unduly diminished by excessive charges through depreciation account in the past.

If the management is satisfied that the present carrying value is large enough, nothing need be put on the books, but the appraised value may be shown on the balance-sheet in a parenthesis. In any event the appraised value would be the basis for the settlement of a fire loss.

If the appraisal is to be put on the books, depreciation reserve should be charged and appraisal adjustment reserve credited. The word surplus ought not to be used unless the increased value is accepted as the real value, in which case the credit would be to the regular surplus, as has already been said.

### Cash Discount on Capital Purchases

*Editor, Students' Department:*

Sir: Will you please discuss the proper handling of cash discounts on capital purchases? Should they be treated as deductions from the purchase price or as "non-operating income"?

Your early reply will be very much appreciated.

Yours truly,
J. A. O.

Cash discount on capital purchases is unquestionably a deduction from the purchase price, whatever view is taken of the discount on revenue expenditures.

It is impossible to make a profit by purchasing anything. It is necessary to make sales in order to realize profits. Even in the case of merchandise purchases, the cash discount is not a profit until the goods are sold. In the meantime it is an unrealized element of a profit to be eventually realized when sales are made. Since capital purchases are not to be sold there will never be any way by which a profit can be realized from them directly. The assets themselves do not produce a profit, but the use of them does.

### Present Worth of an Annuity

*Editor, Students' Department:*

Sir: Will you kindly advise me in relation to the following problem and show how it is worked out?

If a principal of $1.00 will amount to $3.386354 in 25 years at 5% per annum, what would be the present worth of an annuity of $1,250.00 for 30 years at the same rate?

Thanking you in advance, I am

Yours truly,
L. B.

To find the present worth of an annuity at 5% for 30 years it is first necessary to ascertain the figure to which $1 at compound interest for that time and rate will amount. The question gives that value for 25 years only. To find the value at 30 years either multiply successively by 1.05 for 5 years or multiply by 1.276282, which is 1 at 5% compound interest for 5 years, as shown by a table. This will give 4.3219412 as the accumulation of $1 at 5% for 30 years.

Next find the present value of $1 due in 30 years by dividing 1 by 4.3219412. This will give .2313775.

Deducting this last amount from 1 gives .7686225 as the compound discount on $1 due in 30 years.

Dividing the compound discount by .05, the rate of interest, gives the present value of an annuity of $1 for 30 years as $15.37245.

Multiplying this by 1250 gives $19,215.56 as the present value of an annuity of $1,250 for 30 years at 5%.

To prove, start with 19,215.56, add interest and deduct 1250, then add interest on the remainder, deduct 1250, and so on for 30 times.

A quicker and easier way to find the desired amount is to find the present value of each yearly instalment of $1,250. This is done by dividing $1,250 by 1.05; then dividing the quotient by 1.05, and so on with each successive quotient. The total of the 30 quotients will be the amount required.

Thus 1,250. ÷ 1.05 = 1,190.48
1,190.40 ÷ 1.05 = 1,133.71
1,133.71 ÷ 1.05 = 1,079.72 and so on.

## *Students' Department*

### Treasury Stock—Dividends on No-Par Stock

*Editor, Students' Department:*

Sir: May I ask your opinion on the following?

The company which employs me as bookkeeper has had in its employ until a few weeks ago a man who, at the time of coming with this company, had the reputation of being exceptionally fine in his work. He failed, however, to come up to the expectation. He owned 75 shares of stock in the company, and agreed to resign provided the stock was taken off his hands. This the directors agreed to do, paying part in cash, the balance in notes, permitting the stock certificates to be used as collateral at the bank where the first party has note discounted, and allowing him a profit of $250.00, which makes the purchase price still less than par.

The first party purchased his entire holding on the market, the company being under no obligation to purchase stock or protect first party whatever.

(a) Has the board of directors the right to issue company notes for the purchase of stock from dissatisfied stockholders or even use the company's money for that purpose, without the stockholders' consent? This is very doubtful in my mind. The transaction, however, has already been completed.

I am handling this stock in a stock and bond account, rather than as a reduction of the capital stock account, inasmuch as the certificate has never been returned and will not be until all notes are paid.

My reason for handling it in this manner is that by reducing the capital stock account, and not having certificate to cancel, the general ledger and stock book would not agree, the stock ledger showing 75 more shares outstanding than the general ledger.

This certificate still stands on stock book in name of first party.

Am I right?

In further explanation it appears to be the desire of the directors to sell the stock rather than to retire it.

(b) One other question: the company has outstanding $50,000 preferred stock which contains a clause that after 3% per annum on preferred and 10% per annum of common has been paid, each class of stock shall share alike in the profits. Each stock has a par of $100 a share. The larger part of the common stock is held by a few men—one man and his family having control—who want the present common stock exchanged for a like number of common without par.

Is this a proper step to take when considering the preferred stock clause mentioned above?

Preferred has no voting power and the company reserves the right to retire it at $110.

How shall the preferred stockholder determine when 10% has been paid on common, if it has no par?

Wheeling, W. Va. W. H. H.

(a) The law of the state in which the company was incorporated will determine the right of a corporation to buy in its own stock. Assuming that such a step is legal, the directors do not have to consult the stockholders, but can act on their own judgment.

It was an error to charge this stock to a general stocks and bonds account. Discrimination must always be made between the outside and inside affairs of a corporation. Thus, if an outsider were lent money in order to employ otherwise idle funds, the note would be charged to notes receivable, but if any officer or employee borrows from the company or overdraws his personal account, the amount must show as due from officers

and employees. When the stock was bought it should have been charged to treasury stock. The balance-sheet which includes it in stocks and bonds account is a false statement, since it conceals the fact that the capital stock has been reduced, temporarily at least, by 75 shares. It would not be charged to capital stock, because the directors intend to sell it.

The fact that the stock is held as collateral by a bank does not affect the question. The use of the stock as collateral for the company's own notes, however, shows great ignorance on the part both of the bank and of the officers of the company. In the hands of a stockholder the stock has value as security to the bank for that stockholder's note, but when the bank holds the note of the company itself, the stock is absolutely worthless as security. In case the company should be thrown into the hands of a receiver, the note, with all the other obligations of the company, would have to be paid before anything could be paid on the stock, and if the liabilities were not paid in full, the stock would not receive anything. Therefore, either the note would have been paid in full or there would be no value in the stock when it was reached in liquidation.

It may be urged that the possession of the stock would give the bank an opportunity to realize promptly on the loan, but before the bank can have acquired the right to sell the stock, it must have put the company in default for the payment of its note. It does not require any argument to show that there is little or no value in the stock of a company that was unable to pay its note when due, and the bank would find that it really possessed no security whatever by holding the stock.

However, taking the situation as it is, there is nothing to prevent treasury stock from being used as collateral by the company itself. The ownership of the stock rests in the record on the stock ledger, not in the certificate, which is virtually only a receipt. It is not even necessary that any certificate should be issued.

It is altogether different with bonds in the treasury. They can be used as collateral for the company's own note, because they are secured by a mortgage on the fixed assets, and therefore must be paid out of the proceeds of these assets, and thus have a higher rank than an unsecured note. In other words, they have an intrinsic value which the stock does not possess.

(b) Although the common stock has no fixed par value, it has a recognized book value at all times. If all the requirements of the preferred stock have been covered, the common stock owns all the rest of the net worth. To determine its value find the net worth of the company by deducting from the total assets all the outside liabilities. From this net worth deduct the amount of the preferred stock and any accrued dividends unpaid. The remainder will be the value of the common stock. This amount is divided by the number of shares of outsatanding common to find the present value of each share of common. Let us assume that the total issue of common stock is 1,000 shares; that at the beginning of the year there are 925 outstanding (75 being in the treasury); and that the net worth belonging to it is $62,437.50, or so near it as to justify us in calling each share of common stock worth $67.50. If during the year the company should make a little

more than $15,865.63, and it was decided to pay all of it in dividends, the division would be as follows:

| | |
|---|---|
| Preferred dividend at 8% | $4,000.00 |
| Common dividend, 10% on $62,437.50 | 6,243.75 |
| Extra preferred dividend at 5% | 2,500.00 |
| Extra common dividend at 5% | 3,121.88 |
| Total | $15,865.63 |

If the common stock has a book value lower than $100.00 the common stockholders lose by exchanging it for stock of no par value. When the stock was rated at $100 per share it was entitled to $10.00 per share before dividing further profits with the preferred, whereas it would now receive only 10% of its book value, this being in the above example only $6.75. Of course, if the stock has a book value greater than $100.00 the holders would make a corresponding gain. In any event, there is no difficulty in ascertaining when the common stock has been paid 10%.

### Pro-rating Rent

*Editor, Students' Department:*

Sir: As a subscriber to The Journal of Accountancy, the present is to ask your opinion on the solution of the following problem:

A concern wishes to hire the ground floor of a building, eventually to use it for its own business. At present, however, there are four stores under lease, as follows:

| | Square feet | Lease expires |
|---|---|---|
| Store A | 870 | May 1, 1920 |
| B | 1,330 | " 1, 1921 |
| C | 1,360 | Sept. 1. 1922 |
| D | 850 | Nov. 1, 1925 |

The owner of the building offers the floor, subject to these leases, for $35,000 a year from May 1, 1920, the rent increasing so that the new tenant will pay on November 1, 1925, $45,000 a year. The problem is: What will the rent be from May 1, 1921, and September 1, 1922, the known rents being $35,000 from May 1, 1920, and $45,000 from November 1, 1925? Two accountants were asked to make up the rent figures and did not agree, but the lease was made at these rentals:

$35,000 to May 1, 1921.
38,100 " 1, 1921, to September 1, 1922.
42,500 to September 1, 1922, to November 1, 1925.
45,000 after November 1, 1925.

It is maintained the rentals should have been

$35,000 to May 1, 1921.
40,000 " 1, 1921, to September 1, 1922.
43,100 to September 1, 1922, to November 1, 1925.
45,000 after November 1, 1925.

Inasmuch as on May 1, 1921, 50% of the floor was available for the new tenant to use or re-rent and increase rentals. Therefore, 50% of the difference between $35,000 and $45,000 should be added here and 81% on September 1, 1922, as that amount of space would be under control of the new owner at that time; therefore the rent should be $8,100 more than on May

1, 1920—$43,100 as above. The maximum rent is to begin to run November 1, 1925, when the new tenant comes into possession of the whole floor. I know that the question of intent enters into this proposition to some extent, as witness the figures used in the lease, but inasmuch as the rent would have been $45,000 a year from May 1, 1920, had the whole floor been vacant at that time, it seems as though the second figures would have been correct to make the rent due correspond with the value of the premises as they become vacant. Under the second rent the owner would have been about $3,500 better off by the time the $45,000 rent started. Of course this matter is not related to accountancy, but I felt that your experience along mathematical lines would warrant your rendering an expert opinion.

Very truly yours,
J. F. G.

This letter cannot be answered with any certainty, because there is not enough information contained in it and too much must be taken for granted.

It says "the rent would have been $45,000 a year from May 1, 1920, had the whole floor been vacant at that time." This is by no means certain. It is true more often than not, in the case of a long lease, that the rent is lower the first five years than afterwards.

It is necessary to assume that all the floor space was of equal value, which is next to an impossibility. On May 1, 1921, possession will be gained of half the space, but it may be by far the poorer half.

The only way to fix rental values is to find out what the space is worth to the tenant and for what the landlord will let it, all the facts being taken into consideration. When these two agree, the rent is fixed and no theories as to whether it is right or wrong are worth the time it takes to state them.

However, as a purely theoretical proposition, it must be assumed that all the space has the same value. The increase in space from May 1, 1920, is 3,540 square feet and in price $10,000.00. This is at the rate of $2.825 a square foot. When 1,330 feet are released May 1, 1921, the rent should increase 1,330 times $2.825, or $3,757.25, and so on. Thus the rent would be at an annual rate of

| | |
|---|---|
| To May 1, 1921 | $35,000.00 |
| September 1, 1922, add 1,330 feet, $3,757.25 | 38,757.25 |
| November 1, 1925, add 1,360 feet, $3,818.00 | 42,575.25 |
| After November 1, 1925, add 850 feet, $2,401.25 | 44,976.50 |

the small difference to be adjusted. This is very close to the figures actually accepted.

Haskins & Sells and Lawrence & Lawrence announce the consolidation (as of January, 1920) of their professional practices, to be conducted under the name of Haskins & Sells, and under the management in Denver of Page Lawrence and T. H. Lawrence.

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C. C. Sheppard announces his withdrawal from the firm of Crowther & Sheppard, and the opening of offices at 601 Chamber of Commerce building, Pittsburgh, and DePew building, New York, under the firm name of Sheppard & Co.

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Richard H. Scott and Elmer L. Jordan announce the formation of a partnership under the firm name of Scott & Jordan, with offices in the Hanover Trust building, 262 Washington street, Boston, Massachusetts.

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Benjamin Goldenberg announces that he has admitted to partnership Simon H. Rosenthal, and that practice will be continued under the firm name of Goldenberg, Rosenthal Company, Widener building, Philadelphia.

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The Society of Public Accountants of Iowa was recently incorporated. The officers are Rufus Ricker, president; E. G. Prouty, vice-president; William I. Hull, treasurer, and L. J. Muehle, secretary.

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Homer C. Hammonds, Evans A. Nash and Fred Parkinson announce the opening of an office at 614 Herskowitz building, Oklahoma City, Oklahoma.

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Haskins & Sells announce the opening of offices in the New York Life building, Kansas City, Missouri, and Robinson building, Tulsa, Oklahoma.

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Joseph M. Krzyzan & Co. announce the opening of offices at 608 Home Savings & Loan building, Youngstown, Ohio.

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Stephen S. Yeoman announces the opening of an office in the Hume-Mansur building, Indianapolis, Indiana.

Alonzo Richardson & Co., Atlanta, Georgia, announce that Dameron Black has been admitted to partnership.

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Hutchinson & Smith, Dallas, Texas, announce that Ira S. Harris has become a member of the firm.

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Searle, Nicholson Oakey & Lill announce the removal of their offices to 295 Broadway, New York.

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MacHugh & Garretson (San Francisco) announce that J. Gordon Hill has become a member of the firm.

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A. Robert Goldman announces the opening of offices at 299 Broadway, New York.

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Kath & Baughman announce the opening of an office at 346 Broadway, New York.